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THE VERDICT

APPLE WATCH

IS THE TIME RIGHT FOR
A WATCH UPGRADE?
PLUS: BEST WATCH APPS

GOOGLE'S NEW NEXUS PLAYER

GOOGLE'S BACK IN THE LOUNGE
ROOM WITH A BEEFED UP MEDIA
PLAYER... BUT DO YOU NEED ONE
IF YOU HAVE A CHROMECAST?

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EDITORIAL

UNFETTERED SPECULATION



[TAKE A DETOUR]

Smashing the geoblocks

TECHLIFE'S EDITOR RECKONS FAIR PRICES AND UNRESTRICTED ACCESS TO DIGITAL GOODS SHOULD BE BASIC HUMAN RIGHTS.

[DAN GARDINER]

THIS MONTH'S COVER-STORY is dedicated to the dreaded "this content is not available in your location" notification — and more specifically, how to smash it on the head so you never see it again. Geoblocks like these have been widely condemned around the world — and not just by grumpy consumers, but by governments as well. The EU, for example, recently spoke out on the issue, stating that region-based discrimination and price-gouging goes against the 'Single Market' concept the Union is grounded in. Back in late March, the European Commission stated that "too many Europeans cannot use online services that are available in other EU countries, often without any justification; or they are re-routed to a local store with different prices." And in Australia, the federal parliament recommended in a 2013 report that Australian businesses be educated in ways to lawfully circumvent geoblocks to get fairer prices on IT products. The same document (titled 'At what cost?') even suggested that "the Australian Government consider enacting a ban on geoblocking" — although only as an option of last resort if the market is unable to do so on its own. (For those interested, here's the full report: tinyurl.com/tla39-agrep.) If you thought we

were in the clear, however, it's not all sunshine when it comes to the future of digital goods. The aforementioned report's suggestions have yet to be acted upon and, moreover, the upcoming Trans-Pacific Partnership (TPP) — a free-trade agreement being negotiated between the governments of Australia, Brunei, Chile, Canada, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the US and Vietnam — could potentially include more stringent intellectual property laws. At present, the TPP is being written behind closed doors with the input of big business, although there have been several leaks of early drafts that have caused concern amongst consumer-protection groups. You can read the Australian Government's take on the TPP at tinyurl.com/tla39-agtpp and *Choice's* concerns over provisions in the drafts at tinyurl.com/tla39-chtpp. The TPP will be presented to the public before it's enacted as law, so there'll theoretically be time for amendments — provided there's enough pushback. And if you're so motivated, there's already an angry (hyperbolic?) petition up at GetUp against the agreement (tinyurl.com/tla39-gutpp). Wherever you stand, this is definitely an issue tech enthusiasts will want to keep an eye on. ■



WELCOME

IN THIS ISSUE

53

BEAT ONLINE BLOCKS

**COMPLETE GUIDE: GET
UNRESTRICTED ACCESS TO
ALL THE STREAMING MOVIES,
TV SHOWS & MUCH MORE!**



[PAGE 34]
GAMES

*The Witcher 3: Wild Hunt, Project Cars,
Broken Age: Act 2, and more.*



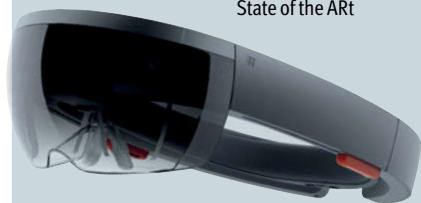


[PAGE 11]
HOT SPOT
Microsoft Surface 3

[PAGE 25]
DISCOVER
Adobe Slate



[PAGE 72]
FEATURE
State of the Art



[PAGE 102]
HELP STATION
Are DVRs still relevant?



[THIS MONTH IN TECHLIFE]

53 Cover story
[PAGE 53]
Beat online blocks

[REGULAR FEATURES]

03 Editorial
[PAGE 03]

08 Hot spot
[PAGE 08]
Apple Watch
[PAGE 11]
Microsoft Surface 3
[PAGE 12]
Essential news on apps, gadgets
and consumer tech
[PAGE 14]
News in numbers
[PAGE 15]
Google Nexus Player
[PAGE 16]
Kickstarted
[PAGE 17]
Pop Sci

18 Lifetools
[PAGE 18]
Challenging yourself
[PAGE 20]
PC gaming on a budget

22 Discover
[PAGE 22]
Tools for tax time
[PAGE 25]
Killer app - Adobe Slate
[PAGE 26]
Multiplatform apps
[PAGE 28]
iOS apps
[PAGE 29]
Android apps
[PAGE 30]
Windows Phone apps
[PAGE 32]
Unearthed - Best new sites,
services, plugins & more
[PAGE 34]
Game reviews
[PAGE 38]
The history of the RPG
[PAGE 40]
Mobile games



[PAGE 48]
TEST BENCH
Tough tech
torturously tested

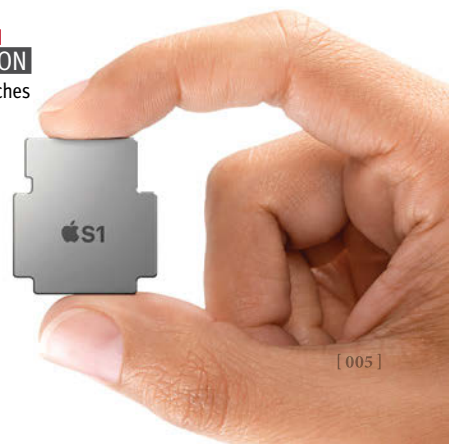
42 Test Bench
[PAGE 42]
Radar
[PAGE 48]
Tough tech torturously tested

72 Feature
[PAGE 72]
State of the Art

78 Help Station
[PAGE 78]
Q&A
[PAGE 82]
Automatically update your Windows
apps
[PAGE 86]
Easily batch-process photos on Mac
[PAGE 88]
Remove unwanted bloatware on
Android
[PAGE 90]
Track your health in iOS 8
[PAGE 92]
Improving BitTorrent over VPN
speeds
[PAGE 94]
Hardening your browser
[PAGE 96]
Getting the most out of your NAS
[PAGE 98]
Core photography skills: exposure
[PAGE 102]
Are DVRs still relevant?
[PAGE 106]
How smart watches work

110 Buyer's Guide
[PAGE 110]
The best tech products

[PAGE 106]
HELP STATION
How smart watches
work



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ASHAMPOO MOVIE STUDIO 2013, ABELSOFT ANTIPHOTO 3 AND 1.ABC.NET FILE FINDER 7



01

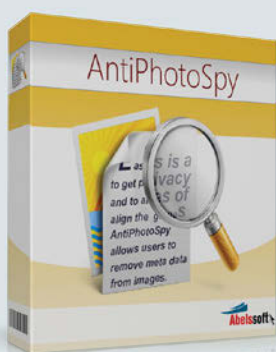
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02



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03



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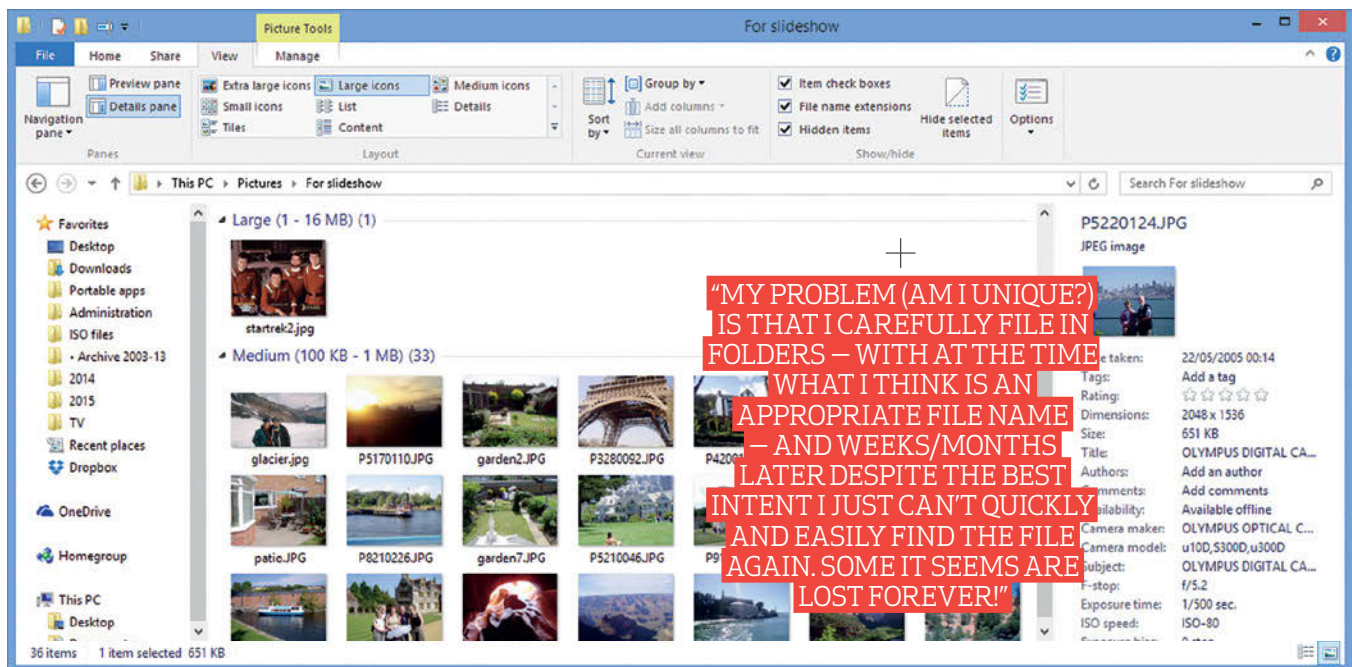
FIPP

THE WALL

GUFF AND STUFF

[COME ON, HAVE YOUR SAY!]

We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to techlife@futurenet.com. All correspondence becomes the property of TechLife and is subject to editing. Letters must include full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.



File it under...

Your recent article on “Advanced File Explorer tricks” (issue 38, page 78) was very interesting and helpful. I would appreciate it if you could take this concept a step further and have an article sometime soon on how best to file documents, emails, pictures, spread sheets, and so on?

My problem is that I carefully file in folders — with what I think is an appropriate file name at the time — and weeks/months later despite the best intent I just can't easily find the file again. Some it seems are lost forever!

Could the feature please suggest or recommend an appropriate protocol for filing documents? Businesses must have something useful, especially when two or more people are involved in filing documents electronically. Perhaps you could also recommend a program or tool which can quickly search and find files (perhaps based on a couple of key words?).

Also how are emails are best filed? Currently I PDF critical emails and file them but this is very laborious. It would be great if emails could be quickly and easily placed in files with other documents that they are associated with. This is becoming a real issue as more and more everyday accounts are now coming via email.

Would a database be the solution to my problem? Can you suggest an appropriate one?

Lastly, if a good search tool can be recommended, would it be possible to dump all files into one folder and let the computer sort it out on a nominated needs basis?

[PAUL HARRISON]

Ed reply: We've found Windows 8's built-in search is quite good at indexing the contents of files (meaning you can just hit the Windows key and start typing a keyword related to what you're looking for), but if you're running an older version of the OS, try installing the Launchy (www.launchy.net), which does much the same thing and is great for quickly finding files or their contents. Mac owners might want to try Alfred www.alfredapp.com, the OS X equivalent.

Snake oil cowboys

I'd like to give some feedback on your VPN article in *TechLife* issue 37 (page 74) where good scores are given to two particular providers. I've had two “interesting” experiences with both of these since trying them out after reading that article.

The first one I tried initially flagged my attempted purchase of its service as fraudulent, presumably because I was using an Australia Post Load & Go card? After emailing the support team, they then accepted money from that card. This would have been unauthorised, as they had knocked back my original purchase attempt and

would have required me — you'd think — to have made a second attempt to purchase their service. Perhaps more disturbingly, the support staff indicated that they were aware of the last four characters of my password. On questioning them, they said that it was just like how companies know the last four digits of your credit card (and use that info to verify your identity, as I can personally attest). How dodgy are these two issues?

With the second VPN provider I tried, they also accepted my Load & Go payment but would not provide the service unless I showed them ID which fit the details of my Load & Go card, which is ridiculous, as the Load & Go card does not use your actual name! Fortunately, they provided me with a refund.

It just seems that this industry is run by cowboys. What are your thoughts?

[STROMEN NORMAN]

Ed reply: VPNs are often used for legally-shady practices — not just for security and privacy — so there are definitely some cowboys in the industry. In testing, we used the free trials or a standard credit card when subscribing and didn't experience any billing issues. The fact that support staff knew your password is a little more concerning, however. It's worth re-iterating that, with the locations of VPN providers spread wide across the globe, the industry is basically unregulated. The good news is that if you have a poor experience with one, there's a multitude of other options out there. ■

HOTSPOT

HOT NEW TECH



The entry-level Apple Watch Sports does everything the other versions do at a fraction of the cost.



[WEARABLE]

Apple Watch review

STEPHEN LAMBRECHTS LETS YOU KNOW WHETHER YOU SHOULD WATCH YO'SELF.

SMARTWATCHES HAVE BEEN available for a few years now, but in many ways the fate of this niche industry has been placed squarely on Apple's shoulders. So can the Cupertino company's entry into this new and rapidly-evolving market be the one to properly sell the idea of a wrist computer to the mainstream? And will the Apple Watch prove to be the smartwatch industry's turning point, much like the iPod was for MP3 players before it? These are just some of the questions we hope to address as we take the Apple Watch for a test... err... wear.

VERY NICE, HOW MUCH?

The Apple Watch is available in three different models (Apple Watch Sport, Apple Watch and Apple Watch Edition), two different sizes (38mm and 42mm), and offers a range of different finishes and band options, all of which adjust the price significantly.

An entry level Apple Watch Sport can be purchased from \$499, though you can go all the way up to the deluxe gold-plated Apple Watch Edition, which will set you back as much as \$24,000.



APPLE WATCH

from \$499
www.apple.com/au

CRITICAL SPECS

38mm Retina display @ 272 x 340-pixels or 42mm Retina display @ 312 x 390-pixels, Apple S1 CPU, 8GB storage x-ion glass (Watch Sport) or sapphire glass (Watch and Watch Edition) screen, capacitive touchscreen with Force Touch, haptic feedback, accelerometer, heart-rate sensor, Bluetooth 4.0

THE DESIGN

While not everyone is going to fall head-over-heels for the Apple Watch's rectangular design, practically everything about the device is elegant and carefully considered. The Apple Watch Sport we tested for this review has an anodised aluminium body that's light and feels sturdy without looking cheap, though it goes without saying that the Apple Watch and Apple Watch Edition versions outclass it in the style department. The latter two also boast sapphire-glass screens that only a diamond could crack. Still, the Apple Watch Sport's ion-X glass and aerospace-grade aluminium are certainly nothing to sneeze at. Underneath the glass is a sharp and vibrant OLED Retina display (identical across each version) which puts other smartwatch displays to shame. Contrast is deep and dark, almost masking the difference between screen and bezel entirely.

There are two hardware buttons on the Apple Watch — a side button, which lets you quickly reach your favourite contacts, lock the device and also power the watch on and off, and the Digital Crown, which is an entirely new input method for an Apple device. Due to its small screen size, touch capability isn't ideal for selecting small details on the Apple Watch. This is where the Digital Crown comes in handy — rotating it allows you to quickly scroll through lists, contacts and your music collection, as well as zoom into images and your home screen. With a short press, it also acts as the Apple Watch's home button. Using these two buttons takes some getting used to, as we initially found ourselves mixing up their functions.

Perhaps one of the Apple Watch's most impressive features is its Force Touch functionality, which lets it perform different functions based on how hard you press the screen and which has also been seen in recent MacBooks' trackpads. (We expect this tech to make its way into future versions of the iPhone.) The watch's Taptic Engine also lets you feel subtle taps on your wrist whenever you receive a notification or reminder.

Finally, release latches let you easily slide out your watch's straps and (for the fashionistas) easily change them depending on your mood or outfit. This also makes it easy to use the Apple Watch on either the left or right hand.

CUSTOMISATION

One of the most attractive elements of the Apple Watch is just how customisable it is. Personalisation is the name of the game, with a variety of watch faces and straps allowing you to make the device truly your own. Firmly pressing down on the screen brings up the watch's customisation options. Here, you can scroll through ten different watch faces, with several styles of clock face on offer, including one that features a wonderfully animated Mickey Mouse. Each face has its own options that let you adjust its colour or choose the details it shows you, whether it be weather, calendar, timezone or moonphase information. Each one is great, although we do hope that Apple provides more of them in the future, as it's not allowing third-party developers to create their own faces.

Getting the right strap will depend on which model you've purchased, and how much money

Adjust your watch face with information tailored to you.



"PERHAPS ONE OF THE APPLE WATCH'S MOST IMPRESSIVE FEATURES IS ITS FORCE TOUCH FUNCTIONALITY, WHICH LETS IT PERFORM DIFFERENT FUNCTIONS BASED ON HOW HARD YOU PRESS THE SCREEN."

WATCHING WHAT 'APPENS

USING THE APPLE WATCH TO TELL THE TIME IS ONLY HALF THE FUN. THE OTHER HALF IS IN THIRD PARTY APPS, AS NICK BROUGHALL INVESTIGATES.

Like any new hardware platform in the past seven years, the Apple Watch will be judged by the quality of its third party app ecosystem. With over 3,500 Apple Watch apps already available, you may need some help deciding which apps you need. Here are the nine best apps on the Apple Watch so far.



TRIPVIEW SYDNEY

When it works, TripView's Apple Watch app is the perfect example of what the platform is capable of. Open up the tripview glance and the watch will use your phone's location data to determine which transport stop from your saved trips you are closest to and give you the time until your next trip departs.



LIFELINE

Who would have thought that a "Choose your own adventure" style instant message game would make such a wonderful smartwatch adventure. This admittedly simple app lets you talk a stranded student astronaut through a crash landing and her subsequent survival. It's both enjoyably written and addictive.



WUNDERLIST

Wunderlist was already one of the best ways to keep tabs on your tasks thanks to its cloud-based synchronisation and collaboration features, but with its Apple Watch version, you can now control your to-do list from your wrist. It's surprisingly useful when shopping, just so you know.



SHAZAM

Sometimes, you just really need to know what that song is playing. You really need to know. Even though Shazam has been solving that problem for years thanks to its simple phone apps, the Apple Watch version makes it easier than ever to identify background music. Karaoke fans will love the wrist-bound lyrics appear in real time too.

you're willing to spend — they range from \$79 for the base Sports Band (which feels great), to \$679 for the Link Bracelet (which can be resized without a trip to the watch repairer). Personally, the magnet options were our favourites: they feel comfortable and are strangely satisfying to snap onto your wrist. If you're worried about security, don't fret — not once did the Milanese Loop or Leather Loop's magnets feel like they could be pulled off with ease.

USING THE WATCH

It's worth noting that the Apple Watch must be paired to an iPhone 5 or above running iOS 8.2+. If you've used other iOS devices, the Apple Watch's OS will feel both familiar and new at the same time. Swipe down from the top of the screen to see your most recent notifications, and swipe up from the bottom to see your 'Glances'. These Glances give you quick access to important information, such as remaining battery power, fitness stats, weather

information, calendar appointments, your heart rate and more. You can also find your watch's functions here, including music controls, maps, and the watch's control center.

If you're making the leap from a regular watch to a smartwatch, you may find it hard getting used to charging the latter on an almost-daily basis. In testing, we found the Apple Watch lasted two whole days on a full charge, which is fairly impressive as far as smartwatches go — although forget to charge it on the second night and you'll be going watchless on the third. That's better than most Android Wear devices we've tested, though a far cry from the e-paper sporting Pebbles.

IS IT USEFUL?

The idea behind the Apple Watch is not to provide another digital distraction from the real world, but to quickly give you the information you desire at a glance, so that you can get right back to it. In part it works as intended, though

you're just as likely to see a message from a friend, and then stop to take out your phone and answer it. You can quickly reply back with a set of pre-written responses from the Watch itself, but these are generally only good for quick impersonal replies. Thankfully, you can customise these responses within the Apple Watch app. There's also the option of using Siri on your Apple Watch to dictate your responses, though personally, we don't really want other people hearing the content of our messages.

Then there are methods of communication that are unique to Apple Watch users. You can create scribbles that automatically send once you've stopped drawing, and there are a range of animated emoticons you can send to quickly let other iOS users know how you feel — you can even hold two fingers down on your screen to send your heartbeat to that special someone in real-time... which is only mildly creepy.

While these are undeniably fun little gimmicks that everyone will try out in the first few days of using an Apple Watch, you quickly run out of funny things to send your mates. In

many ways, that's a sentiment that can be applied to the Watch as a whole — it's full of fun extras, but after a while the appeal of actively toying with it fades away, making the Apple Watch the complementary device it was always intended to be. Whether or not

that makes it an essential part of your smart-device collection is another matter entirely — it's basically going to come down to whether or not you think it makes for an attractive watch in general. But if you're determined to own a smartwatch, then the Apple Watch is easily your best option. ■



“WE FOUND THE APPLE WATCH LASTED TWO WHOLE DAYS ON A FULL CHARGE, WHICH IS FAIRLY IMPRESSIVE AS FAR AS SMARTWATCHES GO — ALTHOUGH FORGET TO CHARGE IT ON THE SECOND NIGHT AND YOU’LL BE GOING WATCHLESS ON THE THIRD.”



YELP

Welp! It's time to eat and you need some help. The last thing you need is a serving of kelp, so you wake up your watch and open up Yelp. Just like on your phone, you can browse bars, cafes and restaurants, with results automatically displayed by proximity to your current location.



UBER

Uber has completely overhauled the transportation industry by making hiring a taxi (or less licensed car-sharing) a mere button press away with your smartphone. The Apple Watch takes it up another level, letting you hire an UberX with a single press from within the Uber watch app.



1PASSWORD

1Password is an amazing app when you're logging in to sites from your desktop web browser or smartphone, but when you need to type in a password on a device without a 1Password app? Major hassle. Luckily, you can now save usernames and passwords to your watch for easy access wherever you are.



LARK

Fitness apps are so impersonal, throwing dry, tedious data at you with no thought for your feelings. Lark is different, acting more like Siri than a traditional app, with regular messages and encouragement. The Apple Watch app lets you keep tabs on your activity and keep track of your food by talking to the app, for a much more human experience.



RUNKEEPER

Apple's workouts app is pretty good, but if you want something a little bit more engaging, Runkeeper also has an Apple Watch app. You can quickly kick off an activity from the watch itself, or if you're trying some interval training, the app will notify you when it's time to change up your exercise.



MICROSOFT SURFACE 3

From \$699; Type Keyboard, \$180; Stylus, \$60
www.microsoftstore.com

CRITICAL SPECS

Windows 8.1 (64-bit), 10.8-inch IPS display @ 1,920 x 1,280 pixels, quad-core 1.6GHz Intel Atom x7-Z8700 processor, Intel HD Graphics GPU, 2-4GB memory, 64-128GB SSD, 1080p webcam, 622g.

HOT SPOT
MICROSOFT SURFACE 3



[THREE STRIKES & YOU'RE IN]

Microsoft Surface 3

THIRD TIME'S THE CHARM FOR MICROSOFT'S BUDGET SURFACE TABLET.

[DAN GARDINER]

INTEREST IN TABLET PCs has been on the wane, with even bigwigs like Apple hit: it now makes more money from its Macs than it does iPads. So it's perhaps not the best time for Microsoft to be launching its third price-conscious Surface tablet, and the official successor to the Surface RT and Surface 2. If any tablet is going to buck that downward trend, however, the Surface 3 might just be the one, thanks largely to its more flexible and productivity-focused design.

The 12.2-inch Surface Pro 3, launched in mid 2014, was a great improvement on what came before. It more clearly solidified Microsoft's view of the Surface as a device as much for work as for play, and this new less-costly version brings the best improvements from the Surface Pro 3 down to a less wallet-busting price. That includes the full version of Windows 8.1, a friendly 3:2 aspect-ratio screen, multi-angle kickstand and (optional) improved Type keyboard. Also along for the ride are the Pro 3's front-facing stereo speakers, full-sized USB 3.0 socket and a mini-DisplayPort output.

It also shaves a fair bit of the size and weight off too, packing a slightly smaller 10.8-inch, 1,920 x 1,280-pixel display and weighing in at 622g (sans keyboard or stylus) and 8.7mm thick. That's still not iPad or Android-tablet class, but it's a big step down from the Pro 3's heftier 798g at 9.1mm.

And inside is Intel's brand-new Atom processor (the x7-Z8700) — a true quad-core chip that keeps Windows 8.1 running smoothly and responsively... provided you don't run more than a few moderately-demanding apps at the same time.

The further-tweaked Type keyboard also bears a mention; it's now got a proper, glass-topped matte trackpad with a physical click mechanism, alongside slightly more travel in the keyboard keys. It's still an optional extra though, as is the stylus. For us, both are basically essential, with the stylus a must to use Windows' industry-leading handwriting recognition. (Seriously, if you want to input text into a tablet this way, Microsoft is lightyears ahead of the competition.)

In laptop mode, one problem we've always had with Surfaces is that the kickstand doesn't

actually work too well on your lap; its precarious to balance. This new model lets you extend that kickstand quite wide, so it's easier to balance... if your lap is long enough, that is.

The new 3:2 display is great, however. As on the Pro, this aspect-ratio makes it excellent for working with office docs and surfing the web.

Some bugbears do still exist. For example, of the 64GB of storage on the entry-level model, with Windows, the recovery partition and Office 365, you end up with about 35GB left. That extends to a healthier 85GB on the 128GB model, at the cost of an extra \$140. That storage can also be expanded by throwing a microSD card (up to 128GB) into the slot located under the kickstand, but that won't be as fast as the onboard solid-state drive.

Starting at \$699 RRP is fairly reasonable given the capabilities on offer and it also includes a year's subscription to Office 365. What makes things a bit trickier, is that to really use the Surface 3 to its full capabilities you'll need to spend another \$240 to add a Type Keyboard and a stylus. Microsoft has done a great job here, with the premium build-quality matching up to that premium price. It's one of the best hybrids yet, but it could still benefit from further advances in mobile PC tech. ■

IT ALSO SHAVES A FAIR BIT OF THE SIZE AND WEIGHT OFF TOO, PACKING A SLIGHTLY SMALLER 10.8-INCH, 1,920 X 1,280-PIXEL DISPLAY AND WEIGHING IN AT 622G (SANS KEYBOARD OR STYLUS) AND 8.7MM THICK. THAT'S STILL NOT IPAD OR ANDROID-TABLET CLASS, BUT IT'S A BIG STEP DOWN FROM THE PRO 3'S HEFTIER 798G AT 9.1MM.

GENERAL PERFORMANCE	ENCODING PERFORMANCE	ENCODING PERFORMANCE	GAMING PERFORMANCE	BATTERY LIFE	BATTERY LIFE
PCMARK8 - HOME (TOTAL SCORE)	X264 HD BENCHMARK 5.01 (AVG FPS)	X264 HD BENCHMARK 5.01 (AVG FPS)	3DMARK - ICE STORM UNLIMITED (SCORE)	PCMARK8 - HOME (HR:MIN)	WEB SURFING (HR:MIN)
1,670	12.69 PASS 1	3.54 PASS 2	24,823	5:14	6:27

[AT ARMS LENGTH]

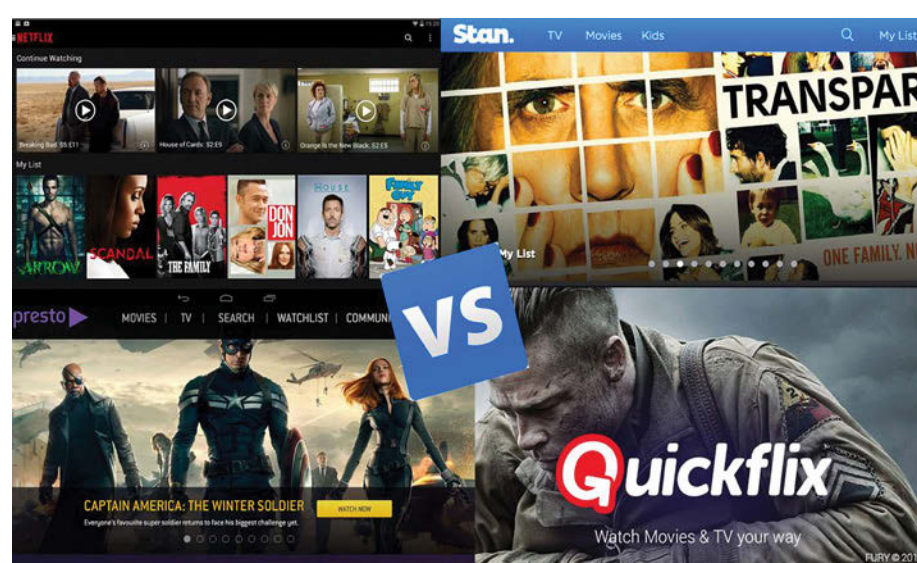
NAVION HOLOGRAPHIC NAVIGATOR
FORZA-STYLE NAVIGATION COULD BE
COMING TO YOUR CAR.

Swiss company WayRay, Inc. has developed a product which could see traditional GPS navigators replaced with augmented reality navigation systems that place holographic waypoints right on your windshield. Best of all, it will be available to every car, regardless of how old it is.

Called the WayRay Navion holographic navigator, the system's display looks somewhat like a racing line from the *Forza Motorsport* series of racing games, giving you the illusion of arrows being placed directly on the road in front of you. These arrows will show you exactly where you need to go without having to take your eyes off the road at any time.

The Navion's heads-up display will be projected on to your windshield by a small device that sits on your dashboard. It also includes smartphone integration, meaning that Navion will be able to project your incoming phone calls and notifications — you'll be able to interact with those through gestures and voice control. Navion is scheduled for a spring release.

[STEPHEN LAMBRECHTS]



[STREAM WARS]

Quickflix joins with Foxtel to fight Netflix, Stan

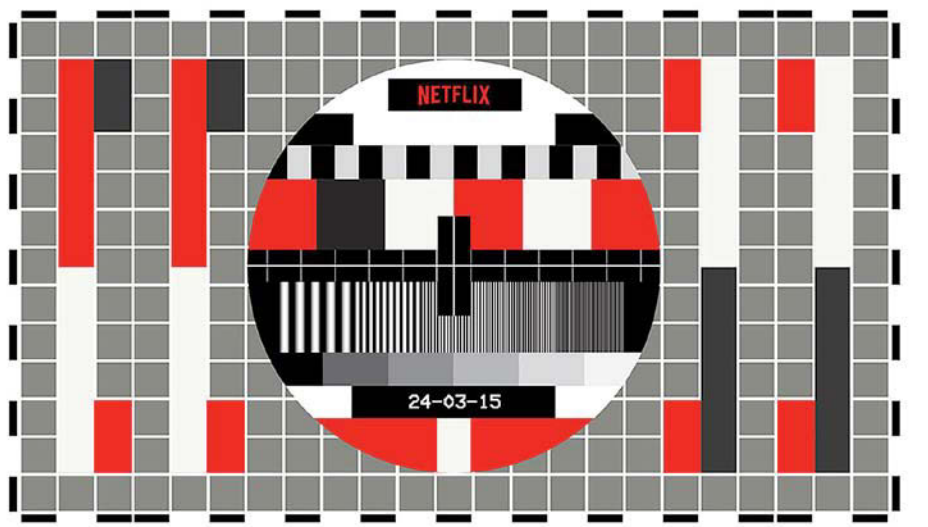
IF YOU CAN'T BEAT 'EM, BECOME 'EM?

IN MAY, THE longstanding Australian DVD-subscription and pay-per-view service Quickflix announced that it would be offering access to Foxtel's Presto TV, movie and entertainment packages instead of its own subscription streaming service. The move was an unexpected development in the current video-streaming war in Australia, with newcomers Netflix and Stan putting the pressure on both Presto and Quickflix.

StreamCo, the Nine-Fairfax company that owns Stan, held shares in Quickflix, which had attached stipulations that mandated a \$10.5 million payout if Quickflix went into liquidation or sold a majority share in the company. However, this new 'distribution' deal that will see Quickflix on-selling Presto subscription-services seems to have circumvented the fineprint — leaving Stan with nothing but its hat in its hands.

The deal has benefits for both Presto and Quickflix. Access to the Presto library of content is a much-needed upgrade for Quickflix and the device infrastructure that Quickflix has spent years building could give Presto a decent leg up on local competitor Stan. Presto said that the deal may take a couple of months to finalise, and that the DVD and pay-per-view streams of Quickflix would not be affected.

[JOEL BURGESS]



[HIDDEN COST]

Aussie Netflix and gaming tax inbound

IT WAS BOUND TO HAPPEN EVENTUALLY.

NETFLIX'S HIGH-PROFILE ARRIVAL on our shores has brought to light a loophole that has allowed overseas digital services to sell their products in our country without charging customers a Goods and Services Tax. That's about to change however, as a new 'Netflix Tax' has been introduced as part of the Federal Budget for 2015.

According to the Exposure Draft posted on the Australian Government's Treasury web site, the proposed bill will be "extending GST to digital products and other services imported by consumers," which will include pretty much any digital thing you can

purchase, including music from iTunes, e-books from the Kindle Store, overseas streaming services and downloadable video games from Steam.

Australian Treasurer, Joe Hockey, said that it's "unfair that overseas based businesses selling services into Australia may not charge GST when local businesses have to charge GST," further stating that "a local business that employs Australians, pays rent in Australia, pays tax in Australia, and helps build our economy is disadvantaged by the current system."

[STEPHEN LAMBRECHTS]

[BANG BANG]

WINDOWS 10 FURTHER REVEALS

ALL THE UPDATES FROM MICROSOFT'S BUILD CONFERENCE 2015.

After struggling to keep up with its competitors' app offerings, Microsoft is pulling out the big guns to make Windows 10 a desirable platform for developers. Its first order of business is to make it possible to bring reworked iOS and Android apps to Windows 10 mobile.

Microsoft wants to encourage development on the Windows 10 platform by adding support for the Objective-C programming language used most-notably in OS X and iOS development. Android apps will be brought to the platform via emulation and through Java and C++ code. Developers would be able to integrate Windows specific capabilities like Cortana, Xbox Live, HoloLens and more into their apps while retaining their original APIs.

The single platform approach that Microsoft has adopted for Windows 10 will allow a Windows 10 smartphone to act as a complete desktop PC. Dubbed Microsoft Continuum, Windows 10 device interfaces will scale and adapt depending on what they're connected to. An on-stage demonstration by

Microsoft's Joe Belfiore showed a Windows 10 phone immediately reconfigure itself into a desktop layout when connected to a monitor, keyboard and mouse.

Microsoft also revealed its much-anticipated Internet Explorer successor, titled Microsoft Edge. The browser will be available on all Windows 10 devices.

Edge allows the user to take notes by drawing right on the browser window as well as on Microsoft documents. It will also include a Reading Mode that removes everything except text and images from a web site, as seen in recent versions of Safari. Cortana voice assistant support will also be included.

Browser extensions are also coming to Microsoft Edge. Developers will be able to port Chrome extensions over to Edge with only a few minor tweaks. While the browser won't launch with extension functionality, it is expected to arrive later in the year. Microsoft has stated that extensions will be available through the Microsoft store.

[STEPHEN LAMBRECHTS]



HOT SPOT
NEED TO KNOW

[BLIP]

DISNEY DEVELOPING A SOFT 3D PRINTER

ENTERTAINMENT GIANT WANTS TO PRINT OUT MORE THAN JET ENGINES AND PROSTHETIC LIMBS.

The Walt Disney company has already conquered the 3D-printed spinning-top, (youtu.be/qquek0c5bt4) making models out of armadillos and teapots that work surprisingly well. Now, teaming up with Cornell and CMU university researchers, the children's entertainment company has set its sights on 3D printing soft toys. Technically though, the current prototype is more of a 2D fabric-laser-cutter that cuts and stacks sticky fabric layers on top of one another.

[JOEL BURGESS]

[BLIP]

A WINDOWS INTO SYDNEY

MICROSOFT ANNOUNCES ITS FIRST INTERCONTINENTAL STORE IS OPENING DOWN UNDER.

Despite the fact that Sydney is above-average when it comes to technological uptake, its small population — in the broad scheme of things — makes it a curious destination for Microsoft to open its first official store on a foreign land mass. Several Microsoft Stores are already open in the US, with the company citing timing and opportunity as the driving factors behind its selection of a 6,000 square meter space in Sydney's popular, Pitt Street Mall shopping area. Sydneysiders can expect to take any device running a Windows OS into the store for troubleshooting by the end of 2015.

[JOEL BURGESS]

[BLIP]

SOLITAIRE BACK FOR WINDOWS 10

MICROSOFT REINSTATES PRODUCTIVITY GAP FILLER.

It could be argued that the Windows 10 platform is Microsoft's attempt to get back to basics. A shining symbol of this is the announcement that, after being conspicuously culled from Windows 8, the card-game Solitaire will once again be embedded into the OS. We guess the rationale behind it is: You're going to need something to do with all the free time offered by its new and efficient applications...

[We can only hope! - Ed]

[JOEL BURGESS]

**3 MILLION****THE NUMBER OF APPLE WATCHES SHIPPED IN FIRST TWO WEEKS.**

Without exact figures from Apple itself, pinning down exactly how many Watches the company has sold is more art than science, but Think Big Analytics' Carl Howe estimated that the initial production run of the various Watch designs was in the vicinity of 3 million units. Going by these estimates, the Apple Watch is the most profitable device the Cupertino company has ever released, with 1.8m Sport, 1.2m Watch and 40,000 gold Edition units generating US\$675M, US\$900M and US\$500M in revenue, respectively. Adding a pooled estimation that Apple pockets 60% of this revenue, the Apple Watch made the company a staggering US\$1.25 billion dollars in the first 2 weeks.

1,000,000,000**PREDICTED NUMBER OF DEVICES RUNNING WINDOWS 10 BY 2018.**

The release of Microsoft's next OS is intended to span 190 countries in 111 different languages — and the software giant is so keen to get the OS out there that they are providing free upgrades to Windows 10 for anyone that already has Windows 7 or 8, whether the copy is legitimate or pirated. (Although pirates will still have to pay for the OS, eventually.) Considering the effort Microsoft has been making in reducing the smartphone app gap between Windows Phone and iOS/Android, alongside the recent moves to make Windows 10 available on platforms like the Raspberry Pi and Arduino, the Redmond company may have the breadth to pull it off.

US\$83.70**HOW MUCH IT COSTS TO MAKE AN APPLE WATCH.**

Considering it'll cost you a minimum of \$500 to slap one on your wrist, it's rather surprising that a teardown report by IHS Technology found that a basic Watch Sport only costs US\$83.70 to manufacture. With material costs adding up to only 24% of the US RRP, the Watch notably undercuts Apple's usual manufacturing/price ratio of between 29% and 38%. This dramatically increased profit margin — on the most value-for-money Watch variation — suggests a completely new tactic in Apple profit making.



The news in numbers

A QUICK LOOK AT THE NUMBERS DRIVING THE BIG TECH STORIES.

[JOEL BURGESS]

360°**THE NUMBER OF DEGREES THAT FUTURE GOPRO CAMERAS WILL CAPTURE.**

In April, GoPro acquired a French camera-solutions company that specialises in VR and 'spherical media solutions'. Kolor not only produces a series of camera rigs designed to mount up to six GoPros (both the standard and waterproof cameras), but also creates the software to stitch together those camera's feeds into three-dimensional footage. The GoPro promotional video showing off the tech, called "Land, Air and Sea", will be available on the Oculus Rift and Samsung Gear VR soon, potentially paving the way for a strong future for the adventure-camera company in VR content production.

#1**DAREDEVIL TAKES OUT THE MOST-WATCHED TITLE ON US NETFLIX.**

According to the San Diego-based entertainment research company Luth Research, *Daredevil* has taken the reins from *House of Cards* as the most-watched show on Netflix in the US. In the first month since the show's release, 10.7% of users had watched at least one episode of the series, compared to the 6.7% that watched an episode of *House of Cards* third season in its first month. These stats were taken from a random sample of 2,500 US subscribers and excluded those who use TV-based apps to watch the service.





GOOGLE NEXUS PLAYER

\$129; gamepad, \$59
store.google.com

CRITICAL SPECS

Android 5.1.1, Intel Atom processor and PowerVR 6-series graphics, 1GB of RAM, 8GB storage 1080p output, micro-USB 2.0 port, 802.11ac Wi-Fi (up to 867Mbps).



HOT SPOT
ANDROID TV GETS REBOOTED

[CHROMECAST GROWS UP]

Android TV gets rebooted

GOOGLE'S NEW NEXUS PLAYER LEVELS-UP THE CHROMECAST INTO A FULLY-FLEDGE MEDIA PLAYER — AND ADDS APPS AND GAMES IN TO BOOT.

[DAN GARDINER]

GOOGLE MADE A big splash in Australian lounge rooms last year with the local launch of the Chromecast — a little HDMI doohickey that essentially acts as a bridge between your 'smart' devices and your TV, letting you throw media and web items from your smartphone or PC onto the big screen.

The follow-up is the Nexus Player. Unlike the Chromecast, it's reasonably self contained; while it still accepts 'casts' in the same way its smaller sibling does, it comes with a dedicated remote and can download and run its own apps and games. There's even the option to add a solidly-built gamepad (at \$59).

The minimalist remote is well-built and sturdy, powered by two AAA batteries, and the optional gamepad is likewise good-quality; it's very Xbox-like in both its general shape and how solid it feels.

Running on Google's Android TV platform — which tailors the OS for use with a simple remote on a TV-sized screen — getting new apps for the Player is straightforward. Tiles for specific TV shows, movies, games and other streaming videos are all displayed and frequently refreshed right on the home screen, making it very easy to play or install new items.

Delve into the Play Store proper and you'll find a cut-down version, sorted into four main categories (entertainment, 'TV remote games', 'casual for gamepads' and 'action for gamepads') with about 20 suggested apps or games in each. There are more than this, but you'll need to find them via searching the Store; currently, Android TV's not very good at app discovery — when you're viewing an app or game, it puzzlingly doesn't recommend similar options... although it does this for TV shows and movies. Searching is

something the Player is actually quite good at, with Google's voice-recognition capabilities meaning you can just speak queries into the top of the remote (provided they're not oddly-spelled or made-up words, of course). Apps and games also specifically need to be designed for Android TV for you to be able to install them.

Google has basic video streaming in place, with a small range of subscription and web-based services available from the get-go. Alongside free streams from YouTube, TED and Vevo, you'll also find Play Store movies and TV shows to rent or buy, and the Netflix app pre-installed with a free 1-month trial — all you need to do is create an account. What's disappointing is that there's no catch-up TV apps yet: Android TV's not compatible with the current versions of ABC iview, SBS On Demand, TENplay, PLUS7 or Foxtel Go.

Games fare a little better. There are some big-name titles, including *Walking Dead*, *Game of Thrones* and *Wolf Among Us*, *Grand Theft Auto: Chinatown Wars* (but sadly not *GTA3* or *Vice City*), *Goat Simulator* and *Star Wars: Knights of the Old Republic*. And even 3D titles run reasonably well — but with games like *Knights of the Old Republic* taking up 2.44GB (around half your onboard storage of 5.8GB) you won't be installing too many of them at the same time.

The Nexus Player's other drawback is that it's not very good for straight file-based video or audio playback. Unlike on an Android phone,

there are no default apps for playing your own media files — and no real way to get them on the device either. While there is technically a USB port in the back, this is of the mini-USB type, so unlike most smart TVs or other network media players (the Apple TV aside), there's no way to plug a USB drive full of movies in.

There are ways around this. For example, you could use Plex to set up a media server on a household PC or NAS box and then stream from there — that's more elegant, but ultimately not quite as convenient as just being able to plug and

“RUNNING ON GOOGLE'S ANDROID TV PLATFORM — WHICH TAILORS THE OS FOR USE WITH A SIMPLE REMOTE ON A TV-SIZED SCREEN — GETTING NEW APPS FOR THE PLAYER IS EVEN MORE STRAIGHTFORWARD THAN ON ANDROID SMARTPHONES AND TABLETS.”



go. Clearly, there's little money to be made from letting you play your own media files — this is a device that wants you to stream content direct from legit sources, not supply your own.

As an overall media player, then, it could perhaps be a bit more flexible. The lack of storage is our primary concern and it's one that's hard to rectify — there's no microSD card slot to add more and the micro-USB port is likewise a bit of a dead end here. (To clarify, it can be done, but it's right-royal pain.) If you don't mind those shortcomings, this is a fairly neat and tidy device for media streaming and casual gaming. ■

[CROWDFUNDED]

Kickstarted!

FROM THE PRACTICAL TO THE QUIRKY TO THE DOWNRIGHT STRANGE, CROWD-FUNDING WEB SITES HAVE ALLOWED THE CREATION OF AN AMAZING RANGE OF PRODUCTS. HERE'S A SELECTION OF LATEST PROJECTS THAT PIQUED OUR INTEREST.

[JOEL BURGESS & JOSHUA PIKE]

[DON'T FORGET!]

Droplet: The Smart Reminder

www.smartestbutton.com | Initial goal: US\$80,000 |
Raised: US\$107,162 from 818 backers | RRP: US\$19

Droplet is a new device to remind us all just how forgetful and lazy we can be. A small plastic button which can be attached to potentially anything that requires routine attendance, it can be set up to remind us if a chore has not been completed or to prompt us when a task is going to require attention soon, via its own smartphone app.

Users press the button once the allocated task has been completed, and the app can monitor and keep a score of your progress. Its appeal will lie in that it could be used for absolutely anything, from completing chores to changing unhealthy habits and avoiding disasters like finding out your goldfish is floating. [JP]



[SAD TROMBONE]

Failed Kickstarter of the month

NOT EVERY CROWD-FUNDED PROJECT
ACTUALLY GETS OFF THE GROUND

[WHERE'S THE REMOTE?]

SIDELICK

www.sideclickremotes.com | Initial goal: US\$150,000
Raised: \$107,516 from 2,579 backers

If you've already set up and regularly use Netflix, then you're probably in the habit of simply turning on your TV and flicking straight to the input of your streaming box — an Apple TV, Roku or WD TV. To do this you need two remotes: one for the TV and one for the media player.

The Kickstarter gadget Sideclick, ditches the former by taking the most essential TV buttons (eg. power, volume control, input selection and channel navigation) and adds them to your media player's remote. It's a shame this one fell just shy of its target. [JB]

JAN
2016MAY
2015

[STICK IT]

MEGA TINY ANTI-GRAVITY CASE

www.megatinycorp.com

Initial goal: US\$25,000 | Raised: \$164,373 from
3,107 backers | RRP: US\$49

This new smartphone case allows your device to stick to multiple types of flat surfaces when you want to go handsfree. Such as for watching movies, cooking from a recipe, recording video, but mostly for taking selfies.

It uses "nano suction technology" to adhere to glass, metal, tile, laminate, even computer monitors, it leaves no residue and can be cleaned with a damp cloth.

It has been developed for the larger smartphones such as the iPhone 6, 6 Plus, 5/5s and Galaxy S6/Edge. [JP]

JULY
2015

[ZAPPED]

ROCKETBOOK

tinyurl.com/tl39rocket

Initial goal: US\$20,000 | Raised: US\$757,170 from
19,165 backers | RRP: US\$29

"My mum microwaved my homework," just doesn't have the same authenticity as the old excuse involving the dog, although thanks to this new product, it's now at least feasible. The Rocketbook's underpinning tech isn't what we'd call groundbreaking: you write in a pad and then upload your scribbles to various note-taking services using a scanning app on your smartphone. As the name may suggest, Rocketbook does pitch itself as the most efficient at uploading scans however, so on the proviso it's accurate that might not be so bad. But the Rocketbook's most-interesting unique feature is that, once all your notes are saved, you can wipe the whole book by tossing it in the microwave and giving it a quick blast. [JB]



[I F & % \$ # @ * LOVE SCIENCE!]

Pop sci

IF THE GEEKS INHERIT THE EARTH, THESE SCIENCE-BASED INVENTIONS WILL AT LEAST MAKE IT A FUN PLACE TO BE!

Nanoparticles to fight tooth decay

A NANOPARTICLE A DAY KEEPS THE DENTIST AWAY.

RESEARCHERS HAVE USED nanotechnology to develop particles that deliver a load of (tiny) bacteria-fighting drugs to the surface of your teeth in order to fight off plaque, tooth decay and other teeth-related ailments. The nanoparticles cling to your teeth and only

release their antibacterial medication once they come into contact with the mouth acids caused by bacteria. Regular topical antibacterial drugs have proved ineffective in the past, as saliva tends to wash them away.

[STEPHEN LAMBRECHTS]



Remote control people?

FAREWELL RC CARS... HELLO RC PEOPLE!

We've all controlled video game characters before, but what if you could control an actual human being? That is exactly the kind of technology that German researchers from the University of Hannover have come up with. Electrodes are attached to a subject's leg muscles, which in turn provide small electrical shocks that guide the subject in certain directions. The technology is intended for exercise routines, physiotherapy and even downloadable walking tours.

[STEPHEN LAMBRECHTS]



TESLA ANNOUNCES POWERWALL

A BATTERY THAT POWERS YOUR WHOLE HOME IS ON THE WAY.

Tesla CEO Elon Musk has unveiled what he believes to be a world-changing home energy solution. The Powerwall is a renewable power source that stores energy generated by sunlight to power your entire household. Tesla Energy plans to initially release the Powerwall in the United States later this year, with plans to expand the product's reach to the rest of the world in the near future. The Powerwall will cost around US\$3,500.

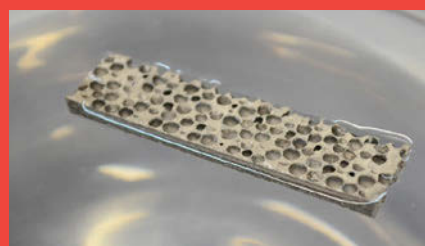
[STEPHEN LAMBRECHTS]



SETI LEVELS UP

NASA ASSEMBLES CRACK TEAM OF SCIENTISTS TO LOOK FOR ALIEN LIFE.

The Nexus for Exoplanet System Science (NExSS) will bring together an interdisciplinary team of scientists to study planets in other solar systems, aiming to further outline the key ingredients required for life. To date, we've only found about 1,000 planets orbiting foreign stars since the first was detected in 1995. The project will see collaboration between earth scientists, planetary scientists, astrophysicists and heliophysicists, in an attempt to pinpoint planets that are — theoretically — habitable. [JOEL BURGESS]



NEWLY-DEVELOPED METAL FLOATS

JUST WHAT WE NEED: TERMINATOR 1000S THAT CAN SWIM...

Researchers from NYU's School of Engineering and the US Army Research Laboratory have used silicone and metal to create a strong metal mixture that can float on water. The metal matrix composite (MMC) is made by embedding silicon carbide beads in a magnesium alloy, which significantly reduces the material's overall density, yet is still strong enough to withstand over 25,000 PSI. The composite is also heat resistant, so it could be particularly useful in building engine bays... or perhaps just an unsinkable ship. [JOEL BURGESS]

LIFETOOLS

ENHANCE YOUR LIFE WITH TECH

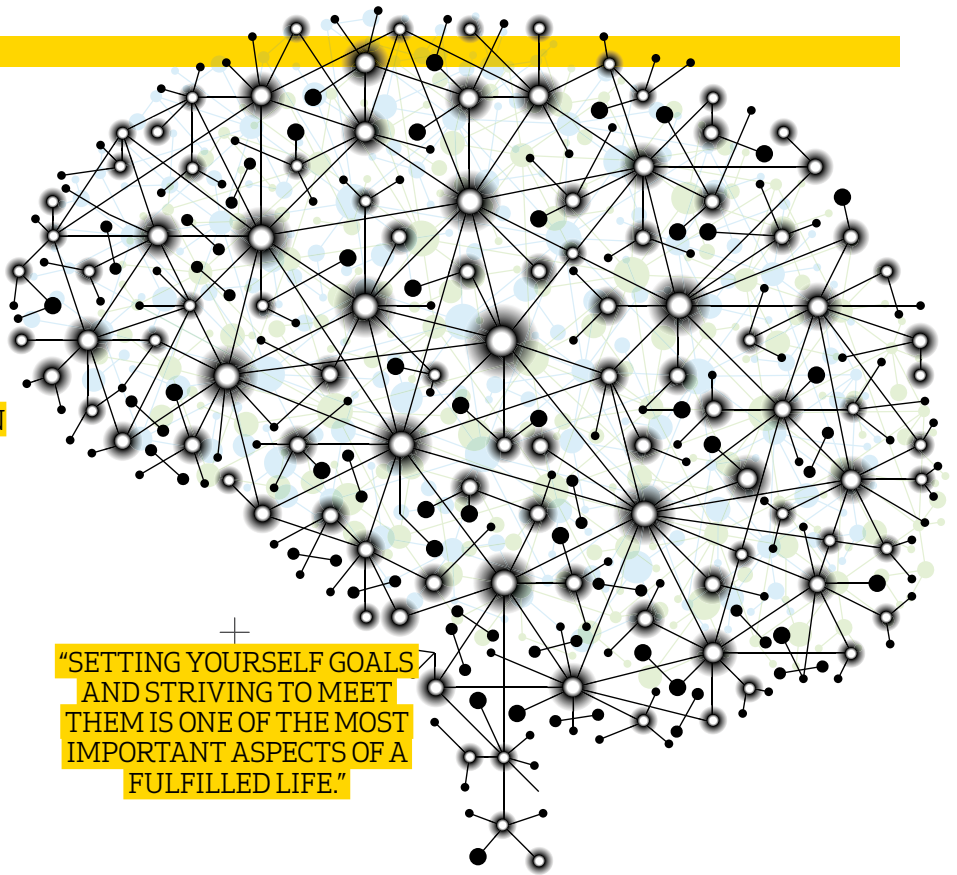
[SPARK UP YOUR GREY MATTER]

Lifetools for challenging yourself

CARPE DIEM: SEIZE THE DAY,
CARP E DENIM: THERE'S A FISH IN MY PANTS.

[JOEL BURGESS]

SETTING YOURSELF GOALS and striving to meet them is one of the most important aspects of a fulfilled life. It's often impossible to juggle everything you want or need to do, all at once, but the process of prioritising goals and achieving them — or at least making headway — can easily slip away in the routine of daily life. This month's Lifetools feature is intended to equip you with the resources to challenge yourself — both physically and mentally — by tackling new tasks. That could be picking up another language, getting a new degree, or even hiking through a mountainous wilderness for charity.



“SETTING YOURSELF GOALS AND STRIVING TO MEET THEM IS ONE OF THE MOST IMPORTANT ASPECTS OF A FULFILLED LIFE.”



[GADGETS]

Bitcoin Miner

THE ULTIMATE CHALLENGE?
US\$50 | products.butterflylabs.com

Set yourself the ultimate challenge, to mine a Bitcoin. Realistically it won't happen this year, nor the next but if you set this box up and leave it running you may mine yourself into profit some day. Depending on how seriously you want to take this challenge, you could possibly include a solar power cell and battery combo to cut down on electricity costs. You may get lucky... and of course maybe not, but that's all just part of the challenge.

Porkfolio

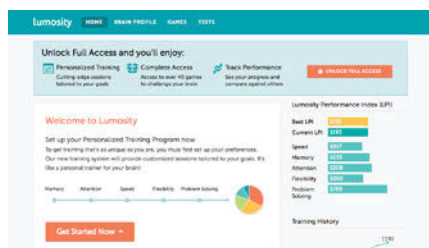
THE E-PIGGY-PIGGY-BANK.
US\$49.99 | quirky.com/shop/607

Set yourself a non-invasive savings challenge by not spending the coins that you bring home. Porkfolio is an app-connected piggy bank that will count all the coins you put in it and deliver a running total, directly to your phone. It'll even flash you with its rewarding pink nose whenever you insert more money. It's highly likely that you've already outgrown this saving gadget, but despite the simplicity this is still a particularly good, low-impact way of saving.

Fibonacci Clock

NOT-SO-SIMPLE ARITHMETIC.
US\$135 | tinyurl.com/TLA39-Fib

So much technology is designed with the aim of making our lives easier, but seeing as we're attempting to challenge ourselves why not a gadget that makes things harder? Yes, the Fibonacci Clock will make telling the time almost unbearably difficult. But if you look at it every day, it's claimed that it'll also significantly improve your capacity to do mental arithmetic quickly. We can't vouch for this Kickstarter's effectiveness but it definitely looks challenging.



[WEB SITES]

LUMOSITY

ILLUMINATE YOUR BRAIN

Free or \$6.70 per month | lumosity.com

Providing one of the most intuitive and well-designed interfaces available on the web, Lumosity guides you through a broad range of games that are varied enough to remain interesting — even though they're really exams intended to catalogue your skill level at various tasks. Lumosity claims to be the most comprehensive brain-training program out there, although it's worth taking this with a grain of salt, as neuroscientists have questioned the efficacy of games like these. Our take? Have fun with it, but just make sure this isn't the only kind of mental (or physical) exercise you're getting.

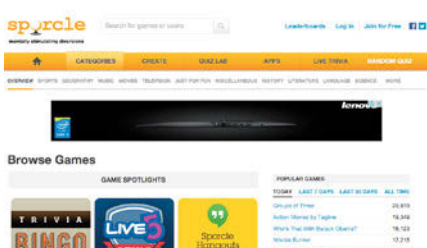


HUMA CHARITY CHALLENGE

TWO BIRDS WITH ONE STONE.

Free | humachallenge.com

Setting yourself a goal is a great way to maintain your health and wellbeing, but setting yourself a challenge that benefits someone less-fortunate can be even more rewarding. Huma Charity Challenge is a web site that organises trekking expeditions in the name of charity. The Great Wall of China, the Inca Trail, the Grand Canyon and the mountains of Nepal, India and Morocco are just some of the locations. With the option to choose either a tailored expedition to collect money for a specific charity, or fundraise for your charity of choice, the site offers an excellent range of personal challenges.

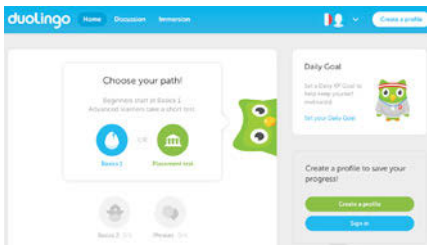


SPORCLE

MEASURE YOUR GENERAL IGNORANCE

Free | sporcle.com

Do you believe you could name a good portion of Steve Buscemi's 96 films, or think you know the 100 most suppressed books of the early 2000s? Why not put that knowledge to the test and challenge yourself and your friends to a round of trivia. The Sporcle site has categorised lists of trivia questions covering everything from physics to specific video games like *Final Fantasy*. Not only can these user-generated quizzes be organised by category, but you can further sort them based on popularity, rating, difficulty and date. Not bad for a free resource.



DUOLINGO

KEEP THE MIND FRESH WITH A SECOND TONGUE

Free | duolingo.com

If you're looking to broaden the mind, then learning a new language or picking up a musical instrument are perhaps the best challenges you can set for yourself. However, if you've ever actually attempted either, you'll know just how big a challenge this is. There isn't a whole lot of objective scientific evidence out there about the effectiveness of Duolingo (barring one company-funded study), but in testing we have found the service both engaging and effective for practicing a new language — they've even listed Klingon as 'coming soon'.



[WINDOWS, MAC, IOS]

ITUNES U

Free with IAP | tinyurl.com/TLA39-ITU

If you really want to challenge yourself, why not take up a degree? If you have the spare cash, then it might be worth enrolling in an online or in-house course at an Australian university, but if not, iTunes U has a comprehensive digital selection of complete course lectures that you can do off your own back. With everything from Stanford programming courses to the literary theory subjects offered by Yale, the free lectures are an excellent starting point for furthering your education.



[IOS]

30/30

Free with IAP | tinyurl.com/TLA39-30-30

We could all be a little more productive. Whether you're working or trying to get through chores on the weekend, getting stuff done faster will free up more time for you to relax. Essentially 30/30 is a to do list with a timer — it sounds simple but it makes for an excellent productivity tool, allowing you to track and reduce the time it takes to do tasks. It has a simple, effective interface that uses stylized primary colours and informative icons and incorporates intuitive swipecable actions for quick navigation.



[ANDROID, IOS]

I CAN BE ANYTHING

Free | icanbeanything.com

Do you have a bad habit you want to kick, or need some help finding the motivation to achieve things? The I Can Be Anything suite of 12 apps may be able to help. Each app focuses on a specific topic, from reducing anxiety to facing your fears, and includes a series of audio tutorials that will help you set yourself challenges. This app is listening heavy and takes quite a bit of time to get through — but then, achieving real lasting results is rarely a quick process.



[ANDROID, IOS]

FAIRSHARE

Free with IAP | getfairshare.com

Living with other people can make the task of keeping the house tidy seem daunting and at times even demoralising. Fairshare is a free app that hopes to change this. After each house-member downloads the app, you can set-up a house account with a communal to-do-list that everyone can see. Daily, weekly and monthly tasks are attributed points — based on the time taken to complete and the difficulty of the task — and tasks can be designated to individuals evenly (even the less-regular chores). If you have young family members, rather than housemates, OurHome is a good variation on this theme, and is made by the same team.

Walkstation LT Treadmill Desk

STROLL YOUR WAY TO A MORE PRODUCTIVE AND HEALTHY LIFESTYLE.

\$1,099 | tinyurl.com/TLA39-Walky

If the thought of committing to a regular fitness routine fills you with dread and you also happen to have a spare thousand dollars to throw at something to help you live a healthier lifestyle then a Walkstation may just be exactly what you need. Challenge yourself to walk at work every day and you can tackle living a healthier lifestyle without sacrificing any time from your busy schedule.



CheapShark compares downloadable PC games from a number of US retailers.

Compare Games displays the cheapest price for game titles across a number of platforms.

For less than \$10, you can get a collection of nine games from IndieGala.

You can play everything from racing games to first-person shooters at GameTap.

FREWARE GAMES

Fancy playing a blast from the past? If your favourite older PC games have achieved classic status, they may have become freeware. For example, the popular first-person shooter *Battlefield 1492* was released as registered freeware in 2012. Check out the Wikipedia article at tinyurl.com/mpuuae to see if your beloved old games are available for free. And if you've got a generous broadband download quota, head over to GameTap (www.gametap.com), where you can play a huge selection of games online across a number of genres.

[BARGAIN HUNTER]

PC gaming on a budget

GET YOUR GAMING FIX ON THE CHEAP – OR EVEN FOR FREE.

[OLGA JEVIC]

THE PC IS the most powerful and versatile gaming machine out there. Unlike consoles, you can customise your computer to play whatever kinds of games you want. PC DVD drive region locking is a thing of the past, so you're also free to buy your games anywhere in the world. Whether you prefer your games on traditional DVD media or are happy to download them online, we'll help you find the best-value games to play on your PC.

PRICE COMPARISON SITES

Of course, the easiest way to find the best price for a particular game is to use a price comparison web site.

Our favourite is Aussie site Compare Games (www.comparegames.com.au), which looks at a number of local and international retailers to find you the cheapest price for disc-based PC games. Retailers include everything from EB Games and The Gamesmen, to JB Hi-Fi and Target, to Amazon and Steam. If you'd rather have the digital version of a game, you'll even find CD keys compared — just make sure you know what you're dealing with for any grey market sites.

If you don't mind ditching the disc, US site

CheapShark (www.cheapshark.com) only compares digital games from a variety of sources, including Steam, Amazon and Origin. Simply select Australia from the drop-down box to display the prices in local currency.

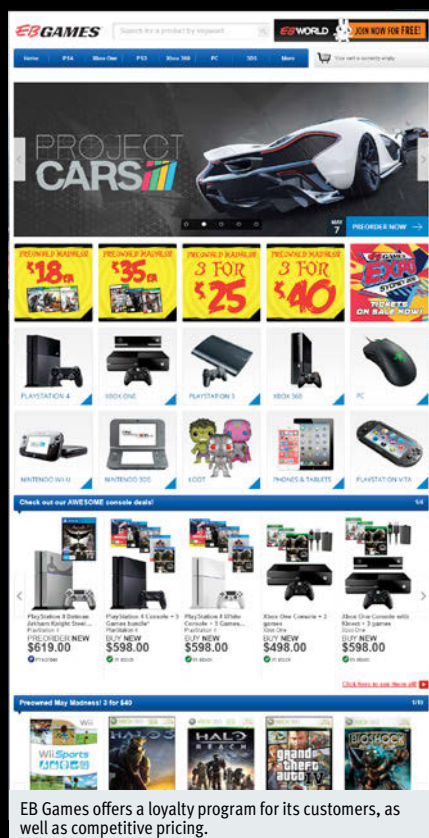
GAME BUNDLES

It sounds too good to be true, but you can often save money by buying games in bulk. There are numerous sites selling game bundles, with the major players being Humble Bundle (www.humblebundle.com), IndieGala (www.indiegala.com) and Bundle Stars (www.bundlestars.com). These services follow a 'pay what you want' model for a collection of both indie and AAA titles, which allows you to sample some independent games you may not have otherwise considered. These sites also have specials, such as IndieGala's Hump Day bundles.

GAMES RETAILERS

Of course, it's not always just about price. Web sites with bricks-and-mortar stores allow you to trade games and even buy second-hand ones, try out gaming hardware and more. Your games retailer of choice may also offer a loyalty or other





"OF COURSE, IT'S NOT ALWAYS JUST ABOUT PRICE. WEB SITES WITH BRICKS-AND-MORTAR STORES ALLOW YOU TO TRADE GAMES AND EVEN BUY SECOND-HAND ONES, TRY OUT GAMING HARDWARE AND MORE. YOUR GAMES RETAILER OF CHOICE MAY ALSO OFFER A LOYALTY OR OTHER INCENTIVE TO KEEP YOU COMING BACK, SO IT CAN PAY TO STICK WITH IT."



incentive to keep you coming back, so it can pay to stick with it. For instance, EB Games (www.ebgames.com.au) offers the EB World program for frequent shoppers of the store — or its Zing Pop Culture shops — who are also into trading their used games.

Other game-specific retailers with great prices and actual shopfronts include The Gamesmen (www.gamesmen.com.au) and Gametraders (www.gametraders.com.au), while you'll periodically find games on sale at major electronics retailers like JB Hi-Fi (www.jbhifi.com.au), Dick Smith (www.dicksmith.com.au), Harvey Norman (www.harveynorman.com.au), Target (www.target.com.au) and more.

Some great local online game retailers include Gamehead (www.gamehead.com.au), Ozgameshop (www.ozgameshop.com), Mighty Ape (www.mightyape.com.au), WOW HD (www.wowhd.com.au) and Games 101 (www.games101.com.au). You'll even find some of these sites selling other goods like hardware, movies, music, books, collectibles, toys and more.

As for international sites, it's hard to go past US retail giant Amazon (www.amazon.com) and UK's Zavvi (www.zavvi.com) for physical PC DVD games, and Steam (store.steampowered.com) and GOG.com (www.gog.com) for downloaded games.

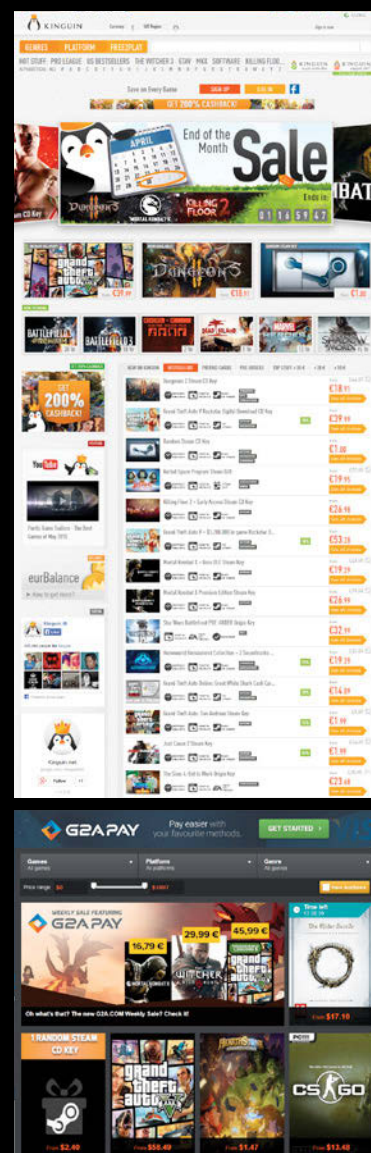
F2P & P2P

Some game developers offer a number of titles that are heavily discounted, free to download and free to play (F2P). For instance, EA is offering *The Sims 2 FreeTime* (tinyurl.com/phbfrfk) as a free download, while *Star Wars: The Old Republic* is F2P (tinyurl.com/5w8u3ks), plus its Origin gaming service has 'On the House' games (tinyurl.com/opwa3rp), where one game at a time is absolutely free.

Steam also offers a huge range of games available on the F2P model (tinyurl.com/44944w5), while a number of titles on Blizzard's Battle.net (us.battle.net/en) are also F2P. MMO fans will find a list of F2P titles at The Big MMORPG List (tinyurl.com/ledp59n).

Other developers' sites worth checking out include Ubisoft Uplay (tinyurl.com/lm2ptsf), along with smaller, lesser-known publishers such as Daybreak Games (www.daybreakgames.com), Big Fish Games (www.bigfishgames.com) and Aeria Games (tinyurl.com/plkfskn).

The pay to play (P2P) games model has been popular in the past, particularly with MMOs such as *The Elder Scrolls Online*. With these games, you pay an upfront fee and play to your heart's content. For a list of P2P MMOs go to tinyurl.com/l976u23, or for a comprehensive list of P2P titles in a variety of genres, visit tinyurl.com/lqubsw. ■



THE GREY MARKET

The legally dubious area of PC games retail is called the secondary or grey market, with European site Kinguin (www.kinguin.net) and Hong Kong-based G2A (www.g2a.com) the most well-known. Here PC game keys can be purchased for (sometimes substantially) less than the recommended retail price, although how those keys were obtained initially by these sites is questionable. For example, Ubisoft recently deactivated a number of keys after it discovered they were originally bought using stolen credit cards. The affected Uplay members learned the hard way the cost of obtaining keys through these grey market retailers. You can read an in-depth discussion of the matter at tinyurl.com/qz7wgul.

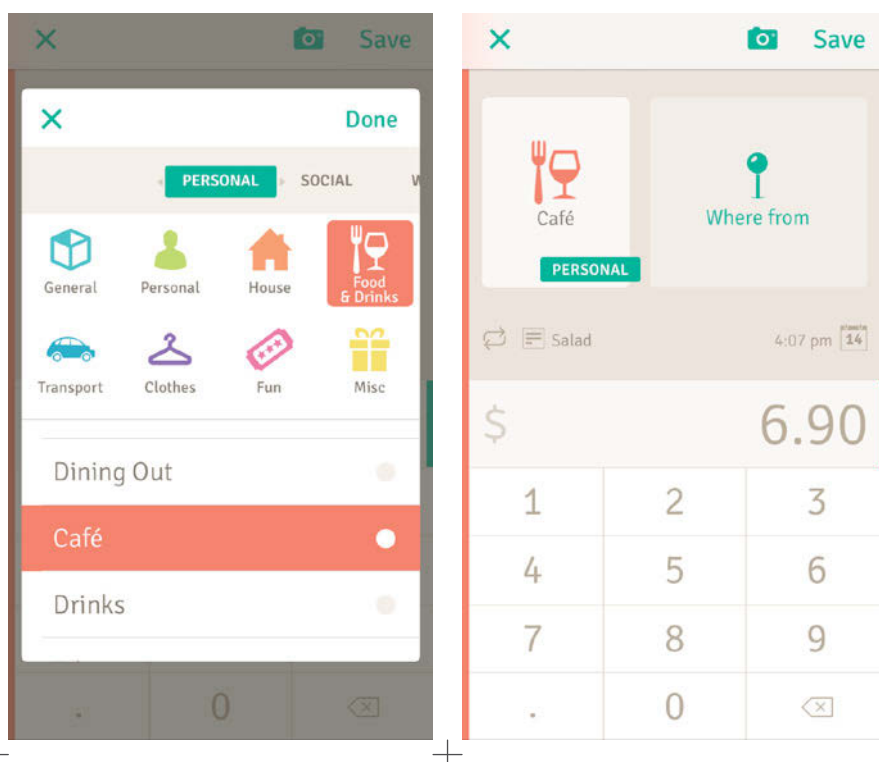
[TIM BOTHWELL]

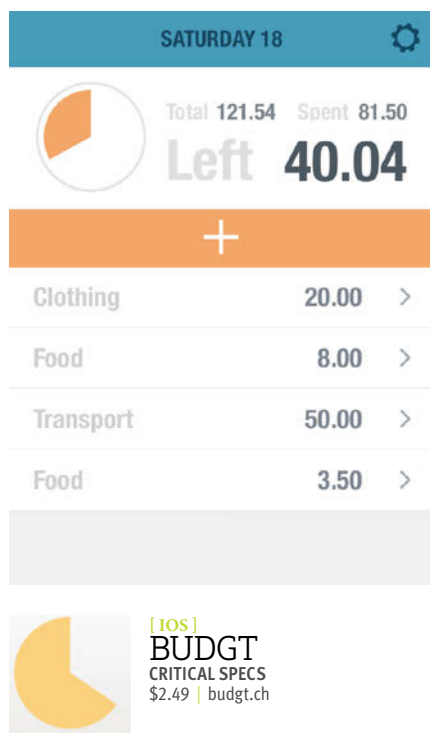


purchases makes it much easier come tax time. In this feature, we've looked at a number of apps and services designed to help reign-in your spending and ensure you can afford the nice (and essential) things in life.

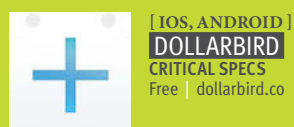


Arguably, the most important thing when you're attempting to stick to a budget is to record every single expense and all sources of income, right down to the last dollar. Wally helps you do this, making it quick and easy to record your daily spending habits, while at the same time encouraging you to stay on budget. In order to record a new purchase, you simply enter the amount, along with a category that the expense falls under, such as transport or food and drink. Even cooler, the app can use your phone's GPS to automatically record the place of purchase and the associated category — useful for when you're trying to recall where you had that late-night kebab the night before.

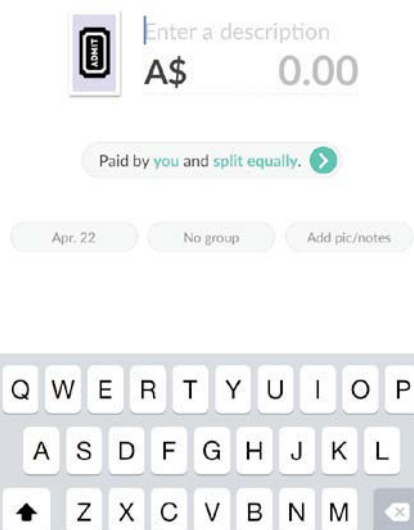




Deciding on an actual budget can be a challenging task — set it too low and you'll struggle to make ends meet; set it too high and, well, it's not really a budget. BUDGT attempts to solve this problem by encouraging you to achieve a monthly budget based on your level of earnings. Once you've entered in your monthly wage and/or other sources of income, the app presents you with a budget in the form of an easy-to-read pie chart, along with a daily budget — one that automatically changes based on previous or soon-to-occur transactions. Like other apps, spending is organised by category, meaning you can quickly see which areas you're spending the most on.



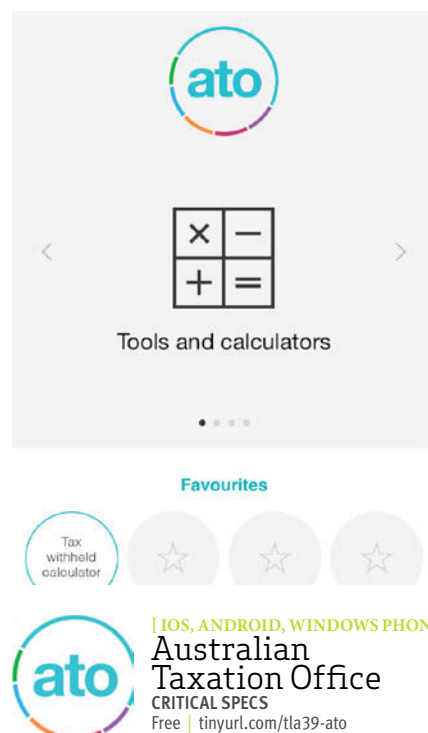
With many people being paid monthly, it's not uncommon for budgets to be set on a per-month basis, and this app helps by using a calendar-based interface to give you a monthly overview of your finances. Presenting all your spending for the month on a single screen means you can instantly see transactions not only for today, but for those in the past as well as the future — which is useful if you have recurring bills that need to be paid. Recording a transaction is extremely easy — you simply enter the amount, along with a category the purchase falls under. While this app mightn't be as feature-packed as some others here, the ability to quickly and easily record new transactions is perhaps what makes it so appealing.



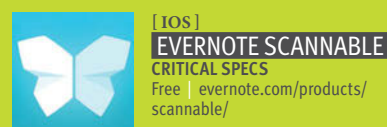
One wise man once told me 'sharing is caring'... and yet I'm still waiting on the \$20 Brian owes me from the fifth grade. While this might help to explain my trust issues, it also demonstrates a problem experienced by many who lend money to others. Splitwise takes a social approach to the traditional IOU, ensuring you're paid back every cent. For example, let's say that one night you go out for drinks with a friend, when suddenly they realise they've (conveniently) left their wallet at home. Rather than throw your drink at them, you simply open the app and record the transaction. It's at this point that your 'forgetful acquaintance' can log in and see the amount that they owe. And to Joe if you're reading this, I'm still waiting on that 'friendship' you promised...



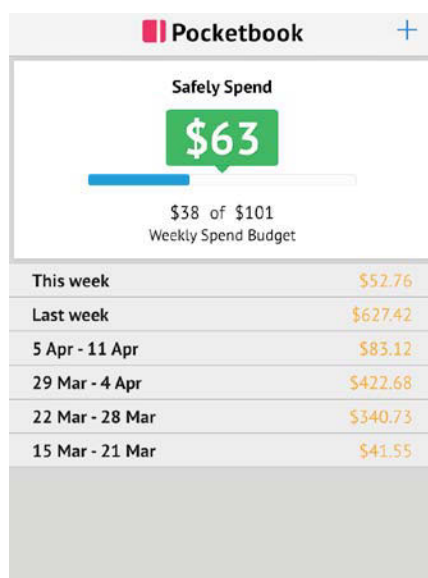
Whether it's a gym membership or an electricity bill, direct debits often go unnoticed, automatically deducted from our accounts without our conscious knowledge. While this may be convenient, it only takes one glitch for the wrong amount to be deducted, all without anyone knowing. That's why BillGuard is a must — it links to your credit or debit cards in order to monitor them for any unusual transactions — such as a hidden fee, suspicious withdrawal, or payments you've been double charged. Using a community approach, the app checks each transaction against a database, instantly notifying you if something doesn't add up. If things appear suspicious, you can report them through the app to stop others experiencing the same thing.



As tax time is nearly upon us, what better app than one straight from the horse's mouth. As the official app of the ATO, this one'll give you direct access to the most up-to-date information regarding your tax affairs. Using your MyGov account, the app provides a number of features including the ability to lodge a tax return, keep track of income tax, and even assist you in your journey of discovering lost super. Businesses similarly can use the app, with the ability to search for ABNs or ACNs, as well as calculate the amount of tax to withhold from salary payments. Also included are tools to make a number of tax-related calculations, such as one to predict how long it will take to pay off a tax debt.

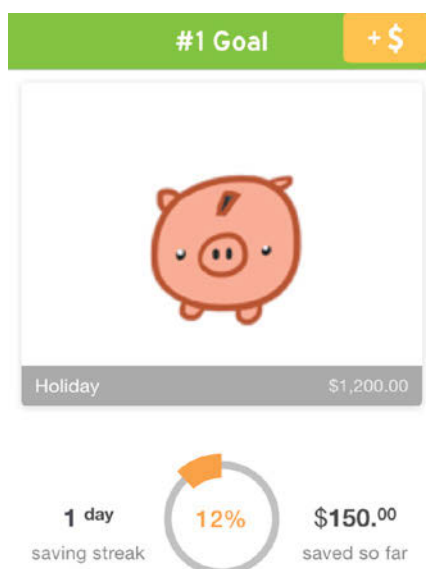


Rather than storing your receipts in that dust-covered shoebox under the bed, why not go digital and store your receipts electronically? Coming from the note-taking powerhouse Evernote, this app allows you to quickly and easily take and store photographs of physical documents. For example, take a photo of a receipt and the app will automatically crop and rotate your image before presenting you with the option to save, send or store your document, even allowing you to send it directly to Evernote for later reference. Not limited to receipts, it can also scan things like business cards — with the app able to use your LinkedIn account to gather additional information based on the contents of the card.



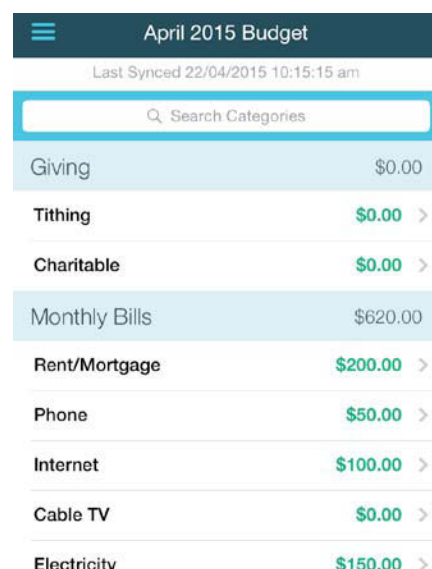
[WEB, IOS, ANDROID]
Pocketbook
CRITICAL SPECS
Price: Free | getpocketbook.com/

We've previously spoken about Pocketbook for its amazing features, and we're still yet to find an app that comes close. Rather than manually enter in your sources of income and expenses, this app links directly to your bank account in order to give you a complete picture of your spending. Probably the most important and useful feature is the app's ability to set a weekly budget, where it monitors your spending and notifies you of your progress or when you're close to reaching your limit. Even cooler, Pocketbook can automatically detect any recurring bills and remind you when they are due. Not wanting to be card-exclusive, it also allows you to record cash transactions manually, with photos and GPS data able to be attached to an individual purchase.



[IOS]
Unsplurge
CRITICAL SPECS
Free | www.unsplurge.com

Whether it's a new pair of dancing shoes or that \$1,000 bagel you're suddenly craving (tinyurl.com/np4d463), this app is sure to help you reach your savings goals ASAP. Using an interface similar to that of your typical social network, you simply enter the amount of your savings goal along with a description, before sharing it with the app's community of like-minded savers. As you record your progress, the app gives you the ability to browse, comment and praise other people's journeys to save. If you do feel so inspired by a particular user's savings goal, you can choose to follow their progress, cheering them on until they reach their target.

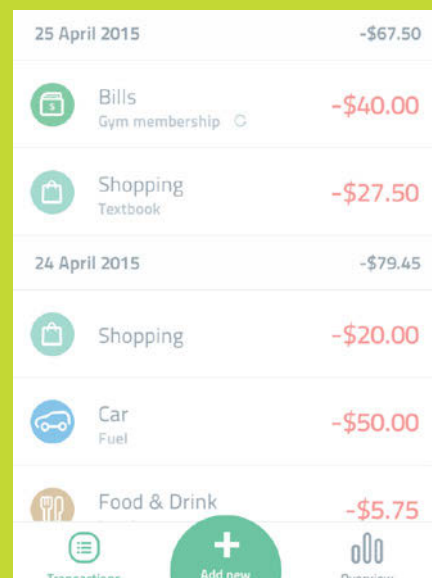
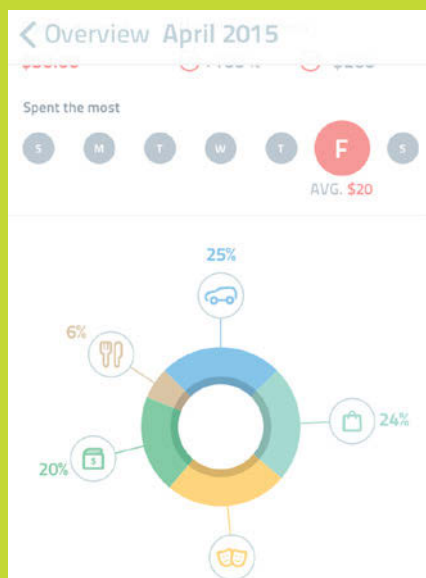


[WINDOWS, MAC, IOS, ANDROID]
You Need A Budget
CRITICAL SPECS
US\$60 | www.youneedabudget.com

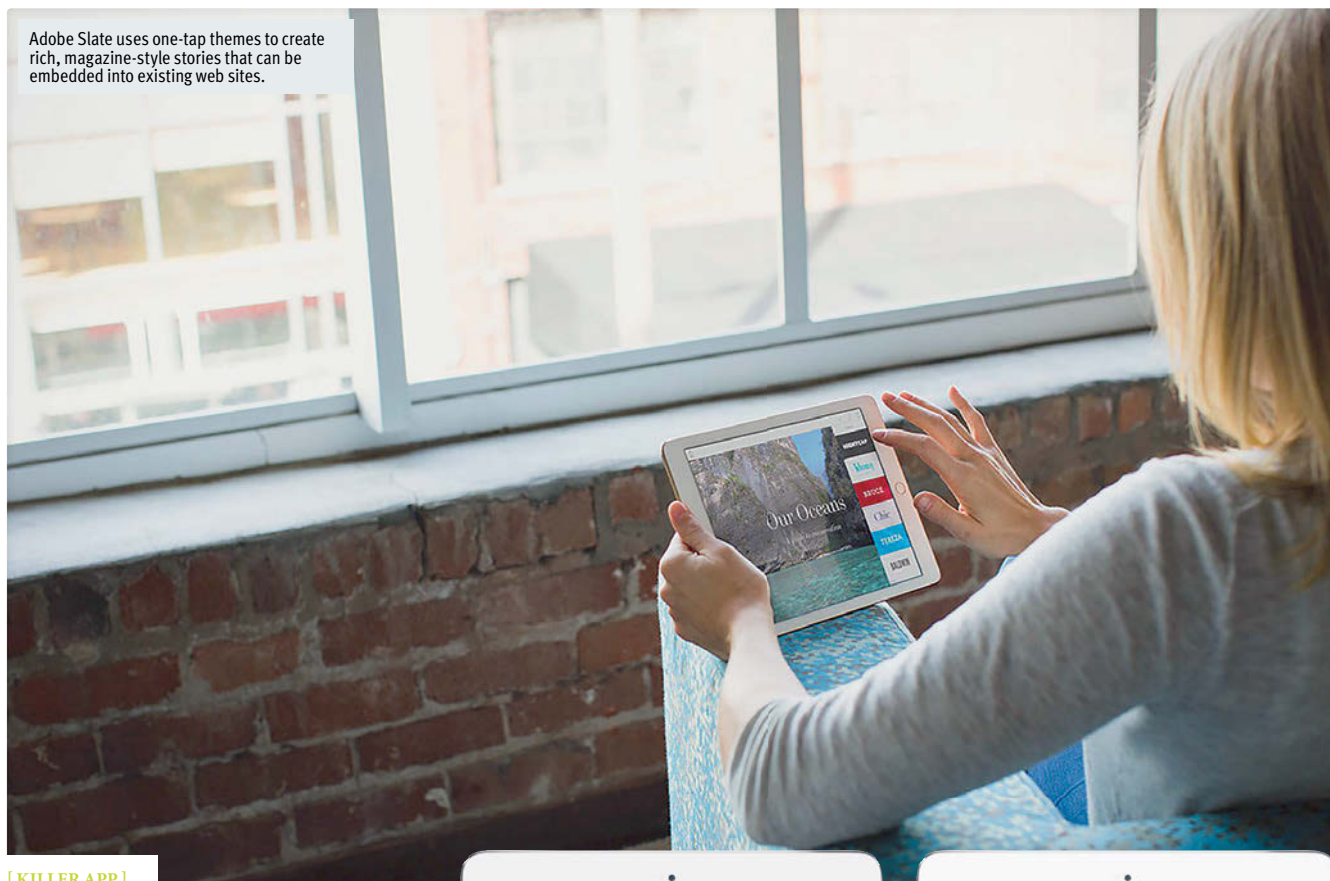
Bear with us while you struggle to figure out how this app would fit into your already limited budget. Let me tell you that this is no ordinary budget app, in fact, it's service is primarily designed for your desktop PC, allowing you to formulate detailed monthly budgets in a spreadsheet-like interface. Using the desktop app, you divide your spending into different categories (such as electricity or car maintenance), while at the same time record any big upcoming expenses you need to save for. Through the power of the cloud you can then use the free mobile app in order to quickly record transactions on-the-go. Overall, a fantastic app for the inner accountant inside you.

[IOS]
SPENDEE
CRITICAL SPECS
\$2.49 | www.spendeeapp.com

Who says budgets need to be dull and boring, for this app presents all your spending in a bright and colourful interface, organised into colour-coded categories. Recording a new transaction is as easy as 1, 2, 3: you press the plus button, enter the amount, and choose a category before it's added to your daily spending activity (and further details can also be added). One unique feature this app has is its reliance on an infographic-style interface when providing a summary of your spending -- something that's both visually appealing and highly informative. On iOS, data entered into the app is backed up to iCloud, with the information able to be exported to Excel or Google Drive.



Adobe Slate uses one-tap themes to create rich, magazine-style stories that can be embedded into existing web sites.

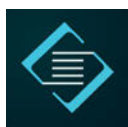


[KILLER APP]

Adobe Slate

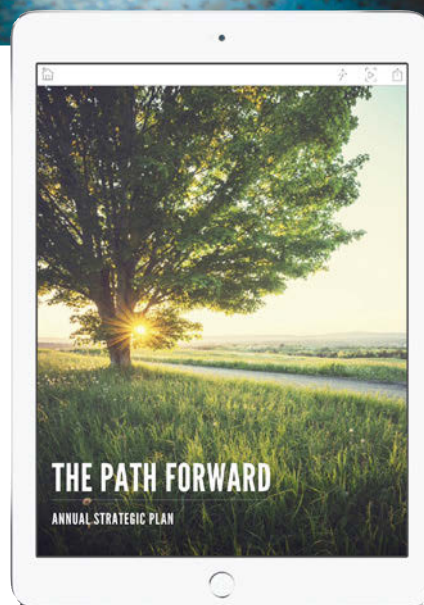
CREATE A GRAPHIC-RICH
WEB SITE IN NO TIME.

[J.R. BOOKWALTER]



[IOS]

Adobe Slate
CRITICAL SPECS
Free | adobe.com



ADOBE HAS BEEN rolling out mobile-centric creative tools at a dizzying pace. Adobe Slate is a visual storytelling app for iPad that helps create graphic-rich, magazine-style web sites.

All that's required to get started is a free Adobe ID (which you can set up without leaving the app), then pick a story theme from Explore to create a new "slate" and begin populating the page. Photos can be imported from iPad, existing Creative Cloud or Dropbox accounts, Lightroom libraries synced to the same Adobe ID, or by searching free Creative Commons images.

There are plenty of ways to control how photos are displayed using inline, fill screen, window, or full-width views. Some layouts offer captions that shift horizontally as the viewer scrolls for added

impact, and can include entire grids which are laid out based on the orientation and number of photos included.

At any point, you can use the magic wand icon to switch between themes, changing the font style, colour, and motion in one tap. Adding text or call-to-action buttons (which link to external web sites) is equally simple, especially when using the built-in speech-to-text dictation, a convenient feature introduced with Adobe Voice.

When finished, Slate makes it easy to publish and share via text, email, or social networks, or even embed the story into an existing web site. The end results are so polished that Adobe used the app to create its user guide instead of relying on the more static, traditional PDF format.

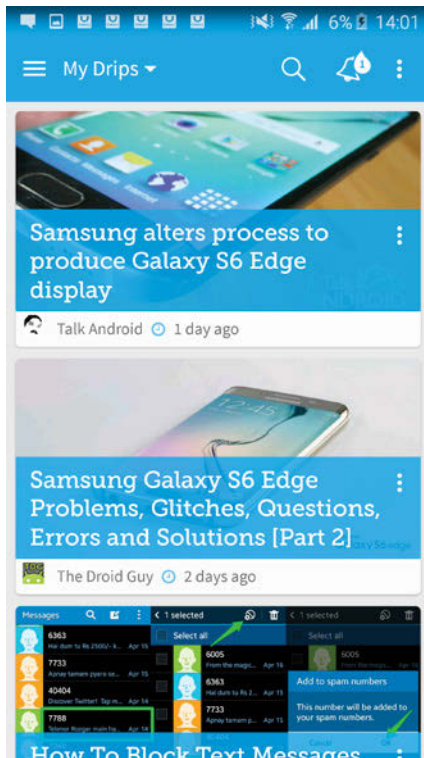
Adobe Slate isn't an all-inclusive web design app. Although the included templates are customisable to some degree, there's no way to create a design entirely from scratch, and stories can't be further edited on the desktop. The initial version also lacks the ability to embed video, and there's no auto sync between devices, although published slates can be downloaded manually from a different iPad using the same Adobe ID.

Overall, Adobe Slate creates an opportunity to build standalone web pages in minutes without the need to get your hands dirty with code. Pros may find the template-based approach limiting, but for everyone else, this app is wonderful. ■

[LATEST APPS]

Magnificent new multiplatform apps

THE *TECHLIFE* TEAM UNCOVERS THE BEST NEW APPS THAT RUN ON MORE THAN ONE PLATFORM.



[ANDROID, IOS]
Dripler
GET THE BEST OUT OF YOUR ANDROID PHONE.
Free | tinyurl.com/p579dc7

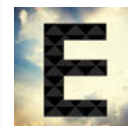
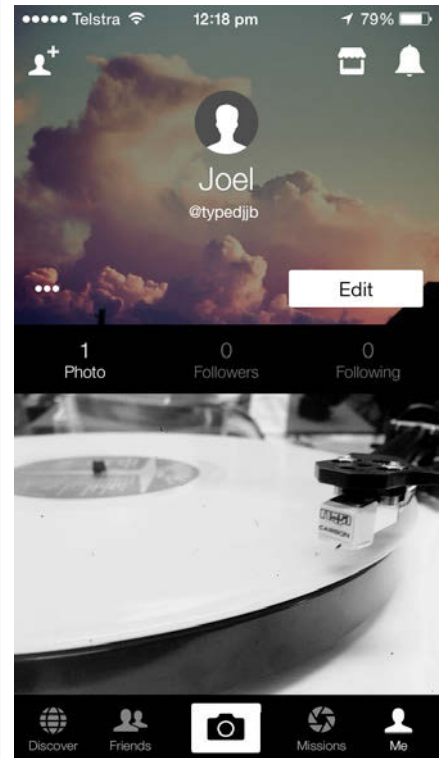
Got a new Android phone and want to keep up to date on all the latest news, firmware updates, apps, tips, and accessories for that specific phone? Dripler will detect exactly which model of Android device you have as well as which carrier it's on, and keep you completely in the loop about it. This information is presented to you in a visually-driven feed that's slick and pleasant to browse (you can even set a preferred font-style). Each time you open something from it or install an app it suggests, Dripler gets a better understanding of the type of stuff you're into for next time. Soon enough, you'll know everything there is to know about your device. Originally on iOS, Dripler is extremely useful in the fragmented Android market, where different devices become compatible with different firmwares and apps at different times. If you were previously an iPhone user and have jumped ship over to an Android, you might just find Dripler to be invaluable. [STEPHEN LAMBRECHTS]



[IOS, ANDROID, WINDOWS PHONE]
Moovit
I LIKE TO MOOVIT MOOVIT
Free | moovitapp.com/

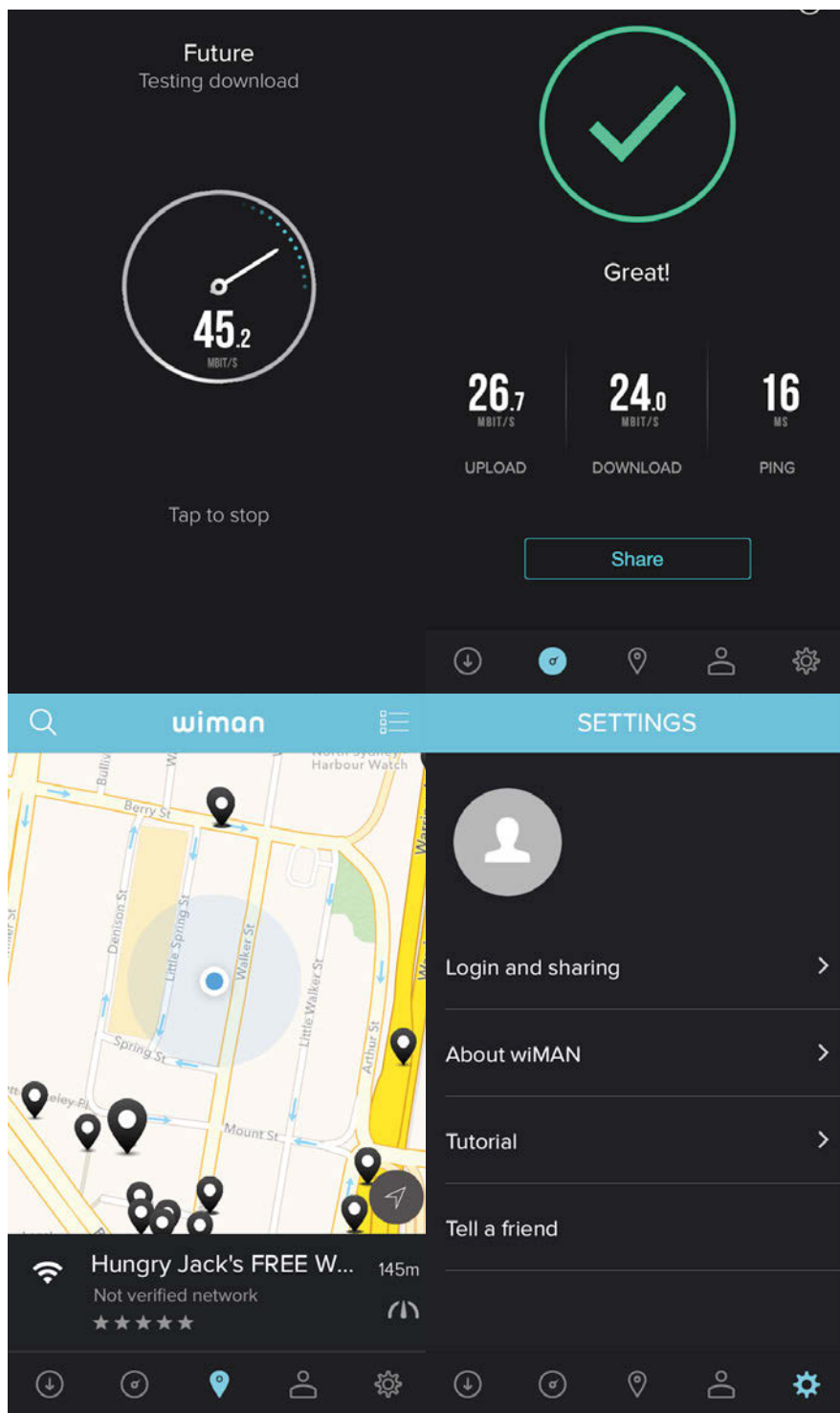
Judging by the conspicuous orange design of Moovit's logo, this new free app seems to be aiming to usurp the stronghold of Australia's popular home-grown companion, TripView. When you consider that TripView costs about \$4, a free competitor sounds like it could be mighty popular. Unfortunately, the similarities between Moovit and TripView end at that orange logo. Moovit has three main sections: a journey planner, a timetable and a favourite stop list. As you begin to use the app it becomes clear that the way you find timetables in Moovit aligns more closely with Google Maps, rather than the 'saved trips' approach of TripView. The app's layout is more suited to discovering new routes than actually being useful in everyday commuting. Considering that Google Maps is free, has almost identical features and can be used to find public transport in most countries, you have to wonder why Moovit would bother. [JOEL BURGESS]

Handy with a camera? How about selling your shots via social media?



[ANDROID, IOS]
EyeEm
A WORD CONNECTED PHONE SCANNER.
Free | eyeem.com

Wanna get paid for your Instagram photos? EyeEm may be the app you're looking for. With 24 filters and a breakdown of sections that include a profile, a breakdown of sections that include a profile, the majority of the app is similar to what you'd expect from most social-media photo apps. Where it starts to get interesting is that EyeEm also has a Missions section. Managed by the developers, Missions are essentially themed competition pages, where you're invited to submit photos that conform to a specific brief. After a set time, EyeEm then sifts through these photos and selects its favourites. If you happen to be in the shortlist you will have your images published in exhibitions — giving you exposure and the opportunity to win prizes. Additionally, a Marketplace area lets you sell any of your EyeEm images. Splitting the profits 50/50 with EyeEm, your photos will be sold for either US\$20 or US\$250, depending on the licence. This might not be a bad little money turner. [JOEL BURGESS]



[IOS, ANDROID]
wiMan
 COVERS MORE AREA THAN WEEMAN
 Free | wiman.me/mobile/

If you're travelling and (like most of us) can't afford to pay data roaming charges but haven't bought a local SIM, then Wi-Fi hotspots can become cherished oases that are handy to keep tabs on. Though there are a few apps and services around that will let you know where these fertile internet springs reside, we haven't come across any as useful as wiMan yet. The better part of the app is simply a stock map that pinpoints Wi-Fi hotspots nearby, but wiMan has a few other unique talents that make it stand out. A dedicated Cites section lets you

pre-download maps including all the Wi-Fi hotspot markers, so you can see where Wi-Fi is even if you're not online. (Requiring an internet connection to look for an internet connection is an irony still suffered by the vast majority of Wi-Fi-finding apps.) The other handy tool that wiMan offers is an internet-speed test, so you can objectively determine which is the best hotspot in town. A simple, effective and free multi-platform app worth tracking down in the appropriate Android or iOS app store.

[JOEL BURGESS]



[ANDROID, WINDOWS PHONE]
HYPERLAPSE MOBILE
 TIME LAPSE JUST GOT EASIER.
 Free | tinyurl.com/lxtkspj

While Instagram's Hyperlapse app might have jumped out of the gate first, Microsoft's own foray into time lapse technology, Microsoft Hyperlapse, has taken its time to refine itself in order to provide an impressive set of apps across both desktop PCs and smartphones. Using an algorithm to create an approximate 3D rendering of the environment being filmed, Microsoft Hyperlapse figures out the proper path taken by the camera and then reassembles the frames around it in order to create an extra smooth time lapse journey.

While Microsoft Hyperlapse Pro for PCs offers more rendering power for better results, Hyperlapse Mobile for Windows Mobile and Android smartphones works quite nicely, with quickly-processed hyperlapse videos that are every bit as good as the ones created by Instagram's app — maybe even slightly better. Hyperlapse Mobile is available now for Windows Mobile and is currently in beta for Android phones, while Microsoft Hyperlapse Pro is available in Preview-form for users of Windows 7 and up.

[STEPHEN LAMBRECHTS]



[IOS, ANDROID]
RELO
 SWITCHING FROM ANDROID TO IPHONE
 HAS NEVER BEEN EASIER.
 Free | tinyurl.com/mo3fqb9

Jumping ship to a new platform has its perks, but it also has its downsides. If there's one thing that no one looks forward to, it's having to re-enter all of your contacts, re-download all of your apps and transfer over any media you might want to take with you.

That whole ordeal has finally become less daunting for Android users looking to cross over to iOS, thanks to Relo — a new app that easily allows you to sync content from one device to another.

Users must first download the Relo app on both devices, then launch them while connected to the same wireless network. A QR code will appear on the Android device, which must then be scanned by an iPhone or iPad to sync.

Only free apps will be transferred, and you can't relocate from an iOS to Android device, but if you're a tired Android user who wants to go the Apple route, this is the best way to do so.

[STEPHEN LAMBRECHTS]

[LATEST APPS]

Impressive new apps for iOS

THE LATEST MUST-HAVE APPS FOR YOUR IPHONE AND IPAD!



[IOS]
Astropad
NEW WACOM RIVAL OR BARGAIN
BASEMENT GIMMICK?
US\$24.99 | astropad.com

Is Wacom looking over its shoulder asking who the new kid right on its heels is? Or is the race over before it has begun? Astropad offers the ability to use your iPad as a graphics tablet, so we wanted to know if it's as good as it sounds.

Before starting, you must ensure you have up-to-date operating systems on both devices. The next important thing to do is ensure your stylus is calibrated with the software. You do this via a rather nifty box that prompts you to touch your stylus against the iPad. As you do so, you are told the sync is successful.

There is a fair bit of tweaking required by specifying which area of your Mac screen your

iPad would use, and we also had to move around a few toolbars to ensure they fitted into the workspace.

After playing with Astropad for a while, we were struck by one recurring issue: a worrying lack of accuracy. On a number of occasions we tried to locate the brush selection palette and were met with a red cross telling us Astropad couldn't do what we were asking of it. Another issue was the latency on the iPad — often newly-selected areas appeared pixelated and difficult to see clearly — a rather important factor when you consider what the software's purpose is.

That said, it does have many endearing features, most importantly the portability factor. It's very easy to forget you are using your iPad as a graphics tablet and, being gadget lovers, we were really taken with that.

[JAMES ROBINSON]



[IOS]
GLASS PLANNER
STAY UBER ORGANISED.
Free | sliderulesoftware.com

Glass Planner is a productivity aid that attempts to seamlessly integrate your calendar and to-do lists. In the "Plan" tab, you create and browse appointments, events and to-dos in a view that resembles Fantastical's Day Ticker. "Act" forces focus on tasks that can still be completed today, while "Done" is a browsable archive of completed and past items.

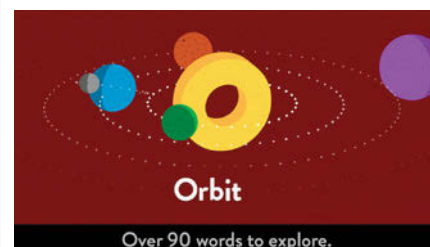
The app initially overwhelms, but assists with liberal pop-up tutorials and by forcing you to start off in the streamlined mode "Simple Glass." Don't skip ahead if you want to get to grips with the concepts. You can then upgrade, although features are split in three (essentially: projects/tags, visuals, and unlimited checklists), with varying pricing and distasteful discounts for spamming your Facebook feed. Fortunately, the app's potential offsets these issues, but you need to put in plenty of time to reap the benefits. It's clever but complicated, Glass Planner will save time, if you put in the effort first.

[CRAIG GRANNELL]



Caterpillar

Transform letters into words.



Orbit

Over 90 words to explore.



[IOS]
METAMORPHABET
FULL OF STRANGE CHARACTERS
\$4.99 | metamorphabet.com

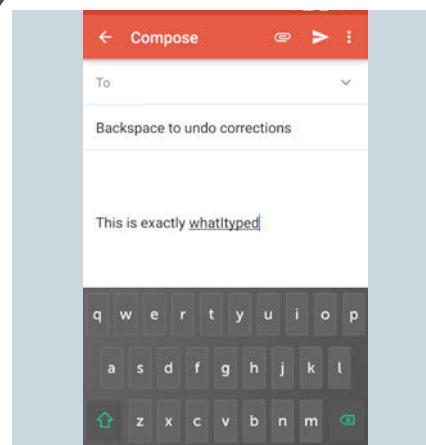
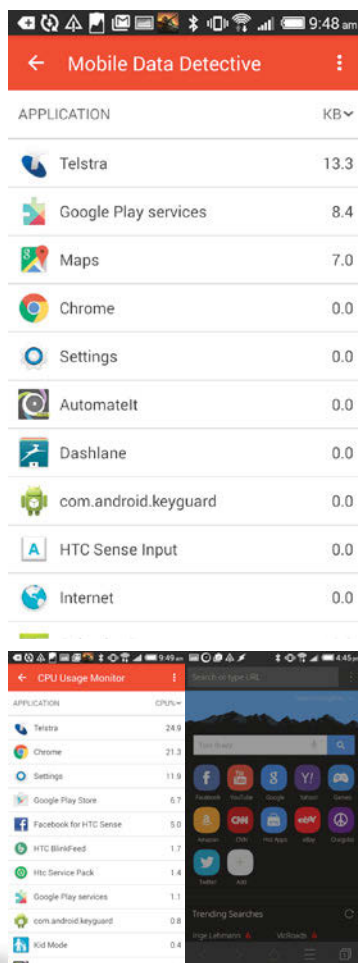
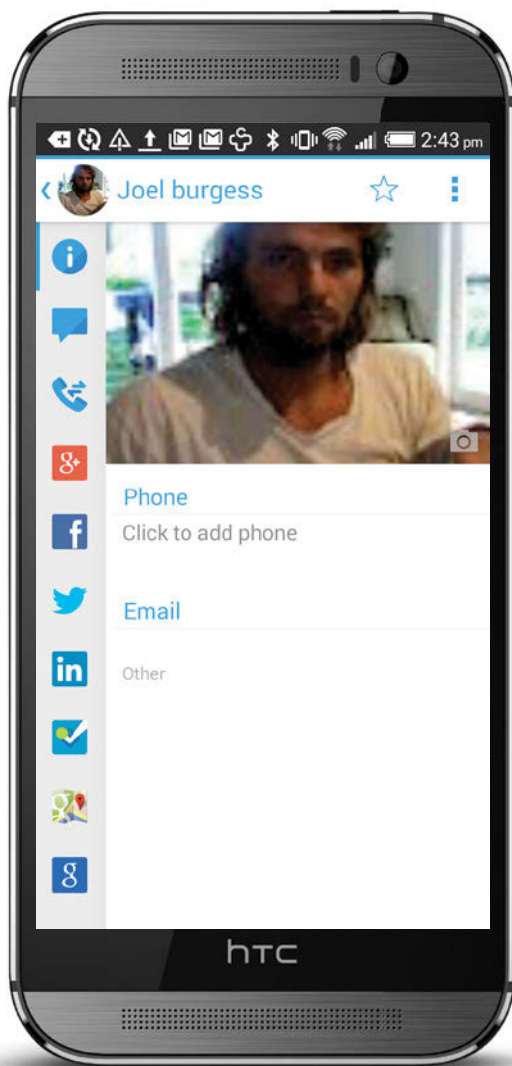
This learning app for kids starts out with the letter A. Tap it and it goes all 3D while a voice says 'A'. Tap it again and it sprouts antlers, which can be bounced with a drag. Another tap and 'A' becomes an arch that begins to amble.

This sort of thing happens all the way to Z, the app revelling in bizarre forms and animations that frequently look like a modern take on things that have erupted from Terry Gilliam's brain.

Occasionally it wobbles. The app's a touch stiff, very definitely American (here, 'vase' rhymes with 'maze' and not 'cars', and the alphabet ends on 'zee'), and fumbles depicting the odd concept, such as 'yesterday'.

However, you can't help but grin when the aforementioned vase turns into a vacuum you can use to suck up a tiny village!

[CRAIG GRANNELL]



[ANDROID]
CLARITY KEYBOARD BETA
AN EXPERIMENTAL KEYBOARD FROM
THE MAKERS OF SWIFTKEY
Free | tinyurl.com/q34pe8u

Entering the Google Play store as a beta, Swiftkey Greenhouse's experimental new keyboard app, Clarity Keyboard, offers users a keyboard alternative based around predicting your style of writing. Setting it up involves answering a question about the way you write — do you type slowly, making sure everything is grammatically correct, or do you fly through your messages and fix mistakes later? The way you answer should give you a Clarity keyboard tailored around your habits.

The idea is to let people type away without having to go back and correct words or add punctuation, as Clarity's 'multi-word autocorrect' should be able to automatically do that stuff for you. If the keyboard makes a mistake, hitting backspace into an auto word will automatically undo Clarity's suggestion.

And, like the Swiftkey keyboard before it, Clarity Keyboard will start to recognise the words you use most often, including phrases and slang words, so that your typing experience should become more streamlined over time. Needs work, but it's a good start.

[STEPHEN LAMBRECHTS]



[ANDROID]
GOOGLE HANDWRITING INPUT
PUT YOUR TOUCH KEYBOARD AWAY,
GRANDDAD.
Free | tinyurl.com/n5zo2zk

Let's just put this out there — no one types these days. What is it, 2008? Handwriting on touchscreens is what all the cool kids are doing, so maybe you should download the Google Handwriting Input tool for Android devices and let the kids know you can be hip, too.

Google Handwriting Input lets you configure your device so that you can use a fine point stylus, or even your digits, to handwrite across all of the apps that allow for text input. It even recognises the emoji that you draw (depending on your art skills).

Handwriting works better than you'd expect, too. I scribbled in my usual messy, cursive style and it almost always understood me. Punctuation can be a bit tricky, but that's about it. No "Eat up Martha" situations to speak of here, Simpsons fans.

And if it doesn't capture your words exactly, it will also predict a couple of other possible options to select with a single tap.

[STEPHEN LAMBRECHTS]

[LATEST APPS]

Adept new apps for Android

WE DIG UP THE HOTTEST NEW APPS FOR ANDROID PHONES AND TABLETS.



[ANDROID]
CM Browser
A FREE, FAST ANDROID BROWSER FOR
THE SECURITY CONSCIOUS.
Free | cmcm.com/en-us/cm-browser/

Picking the right web browser for your Android, which often uses expensive mobile data rather than Wi-Fi, is critical. But, arguably, there isn't all that much incentive to go beyond Chrome, although a great number of third-party browsers do offer interesting enhancements or extras in how they get the job done. The best of them seem to focus on a particular niche. CM Browser is one such effort — it was built by Cheetah Mobile, the company behind Clean Master — one of the highest-rated cleaning, optimisation and security apps in the world. And so it won't be all that surprising to learn

that the CM Browser is excellent at privacy and security. Not only does it have the ability to switch a page to incognito without opening a new tab, there's also a comprehensive selection of data settings, a generous suite of security options and an easy-to-find pop-up blocker. With some of the best browser encryption available and a small total file size, CM promises that it's both secure and efficient — even outpacing Chrome at times. A nice design and intuitive layout adds up to make CM Browser a safe browsing bet.

[JOEL BURGESS]

[LATEST APPS]

Wicked new apps for Windows Phone

GET THE BEST NEW APPS FOR YOUR MICROSOFT-DRIVEN SMARTPHONE.



[WINDOWS PHONE]
Smart Things
"S-M-R-T, I MEAN S-M-A-R-T."
Free | tinyurl.com/TLA39-Smart

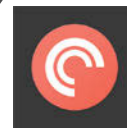
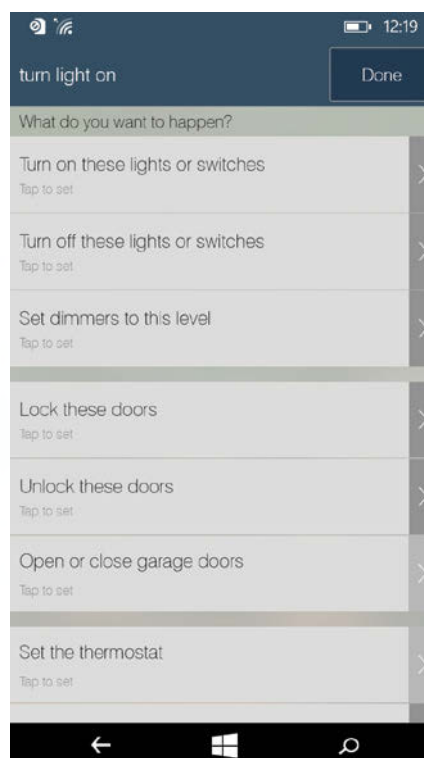
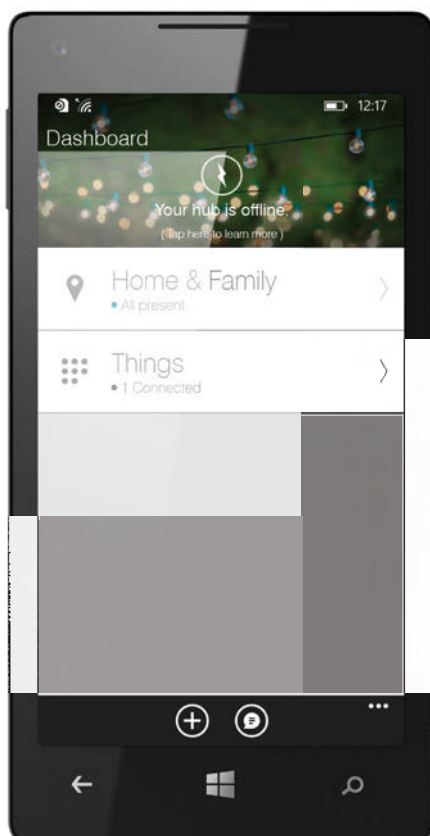
Smart Things began as a Kickstarter in 2012 and has since developed into a sizeable range of home automation products, with a complementary app that connects all these devices together. For the most part, the Smart Things app performs like many of the other home automation apps, allowing you to switch a smart light bulb on or connect to a security camera, but there is one aspect of the app that differentiates it: impartial connectivity. Instead of being limited to the company's range of devices — like the vast majority of apps from 'smart' hardware

producers — SmartThings plays nice with Belkin, Sonos, Philips and Logitech devices, to name a few. The Smart Things app has a streamlined and powerful interface that strikes a good balance between simplicity and customisability and will even let you program some conditional automatic actions (if someone comes home, then turn the lights on, for

example). All-in-all, the Smart Things app is an excellent option if you're into home automation — and considering the limited alternatives on Windows Phone, it's a real standout.

[JOEL BURGESS]

"SMARTTHINGS PLAYS NICE WITH BELKIN, SONOS, PHILIPS AND LOGITECH DEVICES, TO NAME A FEW."

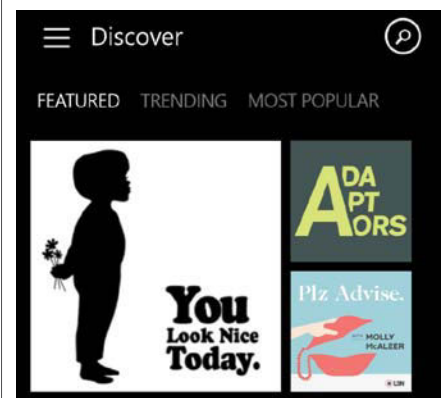


[WINDOWS PHONE]

POCKET CASTS

BETTER THAN POCKET CALLS.
\$4.29 | tinyurl.com/TLA39-PCast

Windows Phone users have had a stock podcasts app for some time, but anyone with the stamina to actually find channels using this podcatcher deserves some kind of diligence medal. Pocket Casts, on the other hand, has been streaming bite-sized audio shows since before iTunes even knew what a podcast was, and in that time the Aussie developers of this app have managed to keep it on top of the long list of podcast managers that have popped up since. A discover section features curated lists of the trending, most popular and featured podcasts, making it easy to find new stuff to listen to. It'll also keep all your subscriptions in the one place and it can be set to automatically download new episodes when you're connected to Wi-Fi. That said, the Windows Phone version is slightly limited in comparison with its older Android and iOS siblings. You can't delete podcasts automatically once you've listened to them, for example, and some of the more specific settings, like the total library size cap, still seem a way off. At \$4.29 it's not cheap, but if you regularly listen to podcasts this app will make all the difference... even this slightly under-equipped Windows Phone version. [JOEL BURGESS]



[WINDOWS PHONE]

THREES

IT'S JUST A SHOVE TO THE LEFT.
Free | asherv.com/threes/

You may have seen, heard of or played the popular Sudoku-come-Rubix Cube, arithmetic puzzle game, 2048. If you felt it was a stripped down game with good mechanics but no real frills, you probably won't be surprised to learn that 2048 is basically a clone of Threes: a slightly different, 14-months-in-the-making, highly-polished puzzle game that appeared first on iOS and even won Apple's game of the year award in 2014. Unlike 2048, Threes has an appealing and colourful design and a decent soundtrack (which the devs believe is good enough to download independently) making 2048 seem like a drab accounting game. The mechanics are a little easier in Threes too, as you can shift tiles just one space rather than slide them across the whole board. That said, there are more tiles to navigate and large numbers can pop into existence on a whim. Even if you happen to already be a 2048 tile-shoving visionary, Threes is different enough to reinvigorate a numerical love-affair during your daily commute. Considering it's currently free for Windows Phone, Threes is a noteworthy addition to the platform. [JOEL BURGESS]

THE
MOST FUN
YOU CAN
HAVE WITH
YOUR HANDS
WITHOUT
GOING
BLIND

this

Sony has managed to make the slate even thinner this time around without giving it a flimsy feel. It's only 6.1mm thick, the same as the iPad Air 2, but there is a sense it would blow away a little easier than Apple's slate would.

At one point I was taking some photos of the sky with the Xperia Z4 Tablet (for reviewing purposes - I'm not into clouds or anything) and did have to tighten my grip at one stage due to a slight gust. If you're not concentrating a heavy wind could easily blow this tablet from your hands.

Sony's infamous flaps are once again in play, there to keep the tablet water and dust resistant to a high degree of IP65 and IP68 but they don't protrude as much as previous models and are a lot less obvious on first glance.



pervasive.



In the wake of the *Mad Men* finale, Don Draper worship is at a fever pitch (and deservedly so), but it's always been pervasive. Jon Hamm once addressed *Don* fandom in an interview with *TIME* magazine: "I'm always surprised when people are like, 'I want to be just like Don Draper.' I'm like, 'You want to be a miserable drunk?' I don't think you want to be anything like that guy." Anecdotally, I've never gotten through an episode of *Mad Men* without my husband murmuring something quietly wistful about Don's life under his breath. Oh, and of course Roger is hilarious. Everyone loves that racist, racist, grumpy silver fox! (Myself included.)

Much has been written about how gender skewers our definition of likeability.

reprint: Pervasive and its others: reprinted with permission

[BEST APPS]

Unearthed

THE **TECHLIFE TEAM'S** FAVOURITE NEW SITES, SERVICES, BROWSER PLUGINS & OTHER HANDY TOOLS.

[BROWSER EXTENSION]

Speedy Readie

READ FASTER IN YOUR WEB BROWSER.

Free | andrewmilton.com/shifty-spritz

SPEEDY READIE IS a Chrome and Firefox extension that's based on a neat e-reading technology from Spritz Inc (www.spritzinc.com) that was first promoted a couple of years back, but which hasn't really taken off like we'd hoped. Speedy Readie aims to increase your reading speed by displaying single words in quick succession. This means you don't have to move your eyes, and words can be displayed at a set speed: by default, that's 300 per minute (compared to the human average of 200wpm) but you can increase or decrease this as desired. Using the extension is simple: select the web-page text you'd like to speed-read and double-tap the Shift key. A reading strip appears below your browser's toolbar and starts flashing words at you. You can hit Shift-Space to pause text, and Esc to quit. It's pretty flexible too: you can select a whole page of text and images and it'll safely ignore the latter, just reading the main body text. The downsides are that there are certain sites it doesn't work on (Gmail, for example) and nor can it read PDFs from within Chrome. Style wise, it doesn't do italics either, and it would benefit from having an option to quickly jump back a few words or a sentence for the occasions when you miss something. We'd still love to see some sort of smartphone implementation of this tech — no more squinting at small text on our phone screens — but if you like to do a lot of web reading, this is potentially a great way to get through more, quicker.

[DAN GARDINER]

Head us on the radio! You can hear us on computers and phones too. [Subscribe here.](#)

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When Rats Inherit the Earth

If humans were to go extinct, what would the planet look like? One paleobiologist says the creatures most likely to take our place are rats.

When Rats Inherit The Earth



How Water Is Bought and Sold

Reporter Ryan Bradley lives in California. Given the drought, he figured it'd be a good idea to buy some water rights. It was more complicated than he thought.

How Water is Bought and Sold



Climate Confessions

We asked for your stories of climate change. You delivered.

Climate Confessions



Yak Life

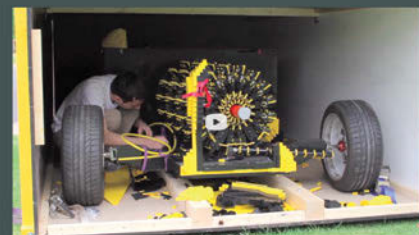
Wild yaks live on the roof of the world, a frosty high-altitude plateau north of the Himalayas. Orbiologist.com began wanted to find out how climate change might affect yaks, so he paid them a visit.

Yak Life



Video: Driving on Air

Why did a young Romanian inventor build an eco-friendly car made out of half a million LEGO pieces that runs on compressed air? Well, why not?



Future Fossils

We can imagine the deep past, full of dinosaurs and dinosaurs and dinosaurs very different from our own. But how are we supposed to imagine the future?

Future Fossils



A Star in New Jersey

In a later world, we'll generate artificial stars from wind turbines that we build all over Earth. Should we? Orbiologist.com began wanted to find out how climate change might affect stars, so he paid them a visit.

[PODCAST]

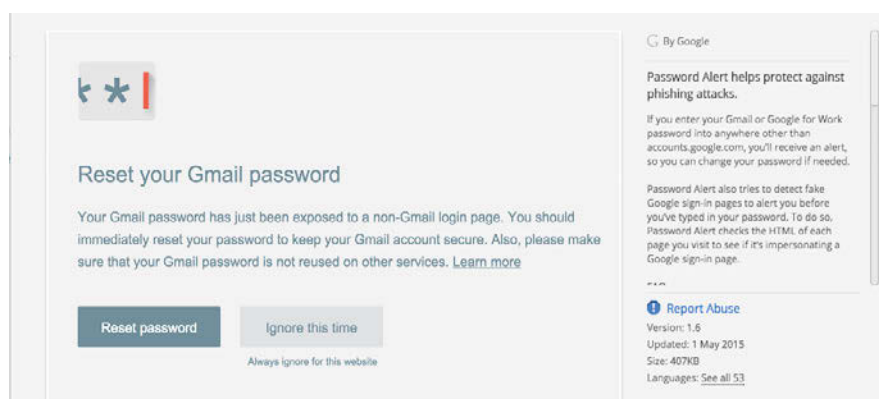
The Adaptors

CAN WE TACKLE THE BIG CHANGES?

Free | www.theadaptors.org

This bi-weekly podcast has the stated goal of exploring "how we will adapt to a changing planet". This isn't some sort of hardcore doomsday-prepper show, though, but a relatively light science podcast, where the host speaks to experts on a new topic (or perhaps 'thread of an idea' is a better term) every episode. The latest episode, for example, explores the concept that if a mass-extinction event wiped out all larger mammals, rats would be the species best-positioned to take over the world from humans. (Our apologies to *Planet of the Apes* fans for this rather horrifying revelation.) Would giant rats evolve to fill ecological niches vacated by other species? (Think giant elephant-sized rats roaming African savannahs.) Would they learn to farm other species — perhaps insects like cockroaches and termites? Would a rat society be more peaceful than a human one? And are rats racist? The answers can be amusing, depressing and surprising — but they're also always enlightening. Episodes are generally about 15 minutes a pop.

[DAN GARDINER]



[BROWSER EXTENSION]

Google Password Alert

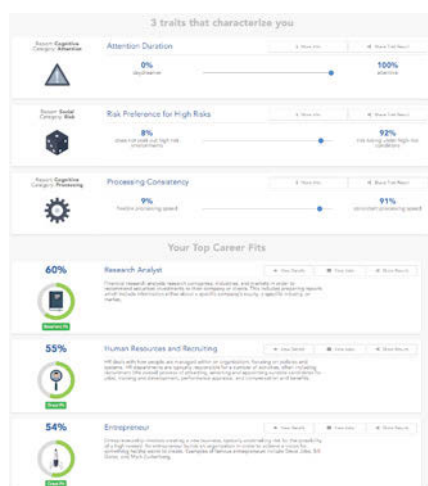
'WARNING: YOU'RE GIVING HACKERS YOUR PASSWORD!'

Free | tinyurl.com/TLA39-GPA

Phishing attacks are a particularly common method that hackers use when attempting to uncover your passwords. Often, these attacks come in the form of an email that looks as though it's from a respectable company, but then guides you to an imitation login page that is designed to steal your password. Google Password Alert (GPA) is a tiny plug-in that you can add to your Chrome web browser to help you defend against this. It'll cross reference any site you're on with Google's official list of login

addresses, making sure you only enter details on legitimate Google account login pages. If you have a few Google accounts or have had run-ins with phishing attacks before then this extension provides a good additional layer of security. If you happen to be the kind of person who wouldn't wear a seatbelt unless the car beeps at you, then GPA has an extra added bonus: it'll harangue on how unsafe it is to use the same password for different Google accounts when you do so. Because it only works with Google's web sites, a password manager like KeePass or LastPass, is still a better option — but as a quick and easy band-aid, GPA isn't a bad option.

[JOEL BURGESS]



[BROWSER GAME]

Pymetrics

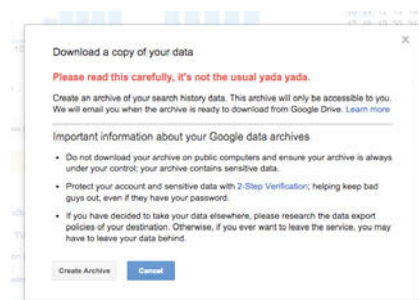
PLAY YOUR WAY INTO THE PERFECT JOB.

Free | pymetrics.com

Finding the right job can be a difficult and daunting task. But what if finding your dream position could be no more difficult than playing a few games? Pymetrics is that game. Sure, it might not have quite the same visceral appeal as your *Grand Theft Autos* or your *Dark Souls* games, but it's probably better at actually trying to work out your ideal career. (Unless that career involves stealing cars, of course...) While we were initially worried that this web site would be a bit half-baked and not really offer anything tangible at the other end, from

our testing it actually seems to reveal some interesting personal metrics — using genuine psychological research — and matches them realistically to the types of jobs that suit how you think. Unfortunately, Pymetrics only has testing for 15 disciplines and they're skewed heavily towards the finance/business industries — though in its defence, it's still in beta. That said, if you're interested in working out which area of business you might excel at, then Pymetrics generates concise and genuinely useful feedback about your results — and can even go a step further, optionally delivering your score profiles to big companies that are looking for candidates with specific traits.

[JOEL BURGESS]



[WEB SITE]

DOWNLOAD YOUR GOOGLE SEARCH HISTORY

REMEMBER THAT TIME YOU SEARCHED FOR...

Free | history.google.com

If you're the type of person who loves to keep in-depth notes on absolutely everything you do, you're in luck — your Google account has a new feature that lets you download a copy of your Google search history, in case you want to incriminate yourself somewhere down the line. Google has let its users view their search histories in the past, but now users can keep a backup of their searches in the form of JSON files. JSON is an open standard format that transmits data into readable text. The backup will be neatly organised into quarterly sections.

To do this, simply visit history.google.com while logged into your Google account, click on the 'cog' icon in at the top right of the screen, and hit 'download'. After some time preparing your archive, Google will email you with the option to download it as a .zip file, or click on a link that will open your archive in Google Drive.

[STEPHEN LAMBRECHTS]

[BROWSER EXTENSION]

TREEV

SEARCH FOR YOUR CLOUD FILES QUICKLY AND EASILY IN ONE PLACE.

Free | treev.co/

As we move into the age of the cloud, it's safe to say that most of our files are spread around in various places, making it somewhat difficult to keep track of them. Introducing treev, a new Chrome extension that lets you add a search bar for your cloud tools to your browser. Not only does treev give you access to most of your files from one handy location, it does so in an especially fast way.

You can sync your Box, Dropbox, Google Drive and Trello accounts to treev, with the promise of support for many more cloud services to be added in the near future. Simply hit the treev icon in your Chrome toolbar to bring up the treev search bar (it's worth noting that you'll need to more or less know the name of the file you're searching for).

The extension also gives you the option of adding treev to your Gmail, so that you can attach files right from the cloud.

[STEPHEN LAMBRECHTS]



[GAMES]

The hunt is on!

THE **TECHLIFE** TEAM REVIEWS THE LATEST GAMES FOR PCS AND CONSOLES, INCLUDING THE HOTLY-ANTICIPATED CONCLUSION TO THE **WITCHER** TRILOGY.

Some areas in the Northern Realms exude an oppressive sense of doom. Crookback Bog is one of them.

The Witcher 3: Wild Hunt

THREE IN A ROW.

From \$89.95 | PC, PS4, XO
www.thewitcher.com



VELEN IS A miserable place. Geralt is here to find a woman, but there are several obstacles in his way, chief among them the destitution and poverty of the land. Bandits burn down peasant huts, drunk barons lord over swampy outposts, and there's no shortage of wolves, drowners and other nasty aggressors.

It's beautiful though. A vast stretch of European pastoralism and Autumnal colours, this region is one of the richest open worlds committed to code. Marshes, quagmires and bramble forests give way to bright stretches of green countryside. A wide river courses through the land, and it's sometimes easy to forget just how corrupted the people living here are.

Corrupted is the key word when it comes to *The Witcher 3*, especially in its opening 30 hours. After leaving a large open region called White Orchard, protagonist Geralt finds himself in Velen. It's always tempting to reference *Game of Thrones* when trying to

convey a certain ruthlessness in fantasy RPG storytelling, but rarely has a game felt so alive with depravity.

You won't need to have played the first two *Witcher* games to enjoy this third installment, but it will help you appreciate how detailed the setting and storytelling is. Geralt is the nominal Witcher, a gypsy-like monster slayer with magical abilities and other supernatural perks, such as heightened senses all the better for sniffing out and solving mysteries.

As such, you won't be building a character from scratch like in a lot of other RPGs: you're Geralt from beginning to end (with a few ultra-spoilerific exceptions). That doesn't mean *The Witcher* lacks specialisation: on the contrary, it demands a solid grasp on how you want to specialise.

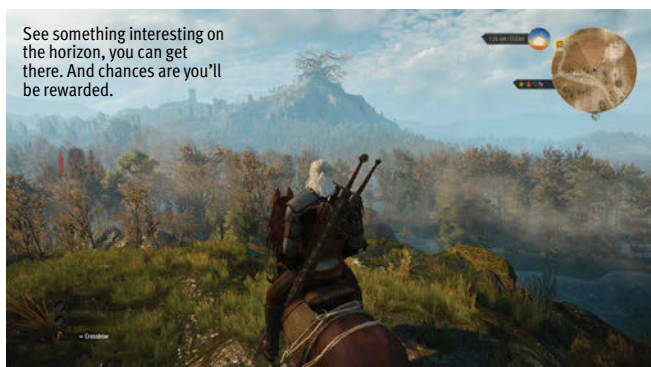
Meanwhile, combat is a hard slog at first, because Geralt is a big lumbering man with a tank-like turning circle. Timing rolls and heavy attacks can be tough, and slashing away

irrespective of your opponent's power is never a good idea. In some ways it resembles the kind of slow and steady approach seen in *Dark Souls*, where no amount of power levelling will compensate for a player's lack of patience and dexterity.

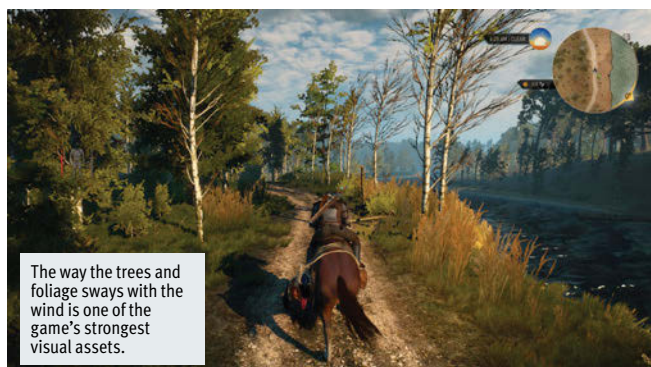
But it's the world building that sets *The Witcher 3* apart. In addition to the rural Velen region, you'll also visit the grandiose Skellige Isles. While the size of the game's two main maps dwarfs many comparable RPGs, that's not even the most impressive thing. The wind and weather is uncanny, dynamic and beautiful. The characters have depth.

The Witcher 3 is one of the biggest, most overwhelming and ambitious RPG projects ever created, with CD Projekt emerging as a true challenger to Bethesda's dominance in the genre. Just take it very slowly, soak the lands in.

[SHAUN PRESCOTT]



See something interesting on the horizon, you can get there. And chances are you'll be rewarded.



The way the trees and foliage sways with the wind is one of the game's strongest visual assets.



Cockpit view is brilliant, and each vehicle is true to life.

There are a couple of point-to-point tracks, but circuits dominate.



Project Cars

AN EXCEEDINGLY CONFIDENT RACER THAT PRIZES AUTHENTICITY ABOVE ALL ELSE.

From \$89.95 | PC, PS4, XO | www.projectcarsgame.com

It probably goes without saying, but if you're after high-speed jumps and roads that calmly weave through idyllic landscapes, then *Project Cars* isn't the racer for you. This is a racing simulator, and more-so than any other major, cross-platform car title of late, it goes to great lengths to simulate. That means you'll need to account for the heat of your tyres, the finer details of your suspension and tuning, and change the load-out of your car according to the weather. This game is a dizzying mess of menus and toggle bars: a wet dream for some.

Well, all that is true if you play it on its highest, simulator setting at least. Anything less makes it a bit more manageable, but why would you bother? *Project Cars* features a large variety of familiar race tracks (Laguna Seca, Mount Panorama and so on) and an impressively-large range of cars to race, but it's not a high-speed power fantasy. Yes, it looks gorgeous, but race tracks tend not to be especially fun things to look at anyway. Don't buy *Project Cars* because

it's the most beautiful racing game there ever has been: buy it because it's among the most detailed.

It supports 16-player multiplayer online, and 32 if you're using the 64-bit Windows version. This, combined with the diverse range of career options and the abovementioned weather, lends near-endless longevity to the game. The career mode is a bit of a slog if you're either a newcomer to realistic racers or reluctant to race karts for several seasons to establish a name for yourself, but we know people who dream about this. Seriously.

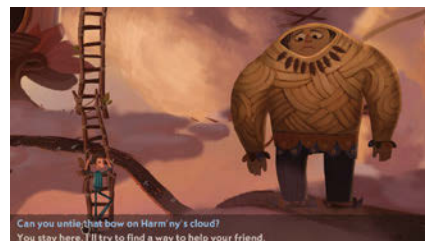
Above all, *Project Cars* is great because it takes itself seriously and is very comfortable in its own skin. It's not a *Forza* or *Gran Turismo* — desperately trying to please all crowds — and it's not afraid to bypass the gruellingly masculine hoon culture that so often pervades today's driving games. It's for racing enthusiasts with a fine eye for attention, and it excels.

[SHAUN PRESCOTT]

High speeds are achievable in *Project Cars*, but you've gotta be bloody good at the game.



TECHLIFE
EDITOR'S
CHOICE
TECHLIFE.NET



BROKEN AGE: ACT 2

THE POINT-AND-CLICK FINALE LIVES UP TO ITS CREATOR'S NAME.

Double Fine's decision to split *Broken Age* into two parts caused a bit of a kerfuffle among the kind of noisy wallies who really shouldn't be allowed to arm themselves with a Twitter account. It wasn't what was originally promised, sure, but the exquisite production values of Act 1 more than justified the Kickstarter fund outlay, and when the money ran out the studio went ahead and funded Act 2 from its own, presumably double-lined, pockets. And, you'll be pleased to hear that it's a fine conclusion to the first new Tim Schafer-penned point-and-click adventure for the best part of 17 years. It's also significantly bigger than the opening, which should assuage fears raised after the release of Act 1 that the game could be too slight. And Act 2's head scratchers are considerably tougher than the ones encountered in the previous episode. While *Broken Age* was released in two parts, it was conceived as a single game, and so Act 2 sees a natural steepening of the difficulty curve. The ever-popular structure of triumvirate puzzles that can be tackled in any order has been retained, and you can still switch between Vella and Shay at any time to give you still more options. But there are now also puzzles that can only be solved by using knowledge obtained in the other character's story. All of this plays out in the same areas you explored in Act 1, however, with only a handful of new scenes thrown in. Everything's changed as a result of your previous actions, but it's hard not to be a little disappointed that your journey doesn't lead you further afield. Taken as whole, however — which is exactly how *Broken Age* should be played — it remains an unfailingly charming game with a plot and cast of characters that can go toe-to-toe with the classics. We only hope there's more where this came from.

[BEN MAXWELL]

From \$12.99 | Android, iPad, PC, Mac, Linux, PS4, Vita | www.brokenagegame.com





ASSASSIN'S CREED CHRONICLES: CHINA

ONE FOR THE HISTORY BOOKS.

The most exciting thing to happen to *Assassin's Creed* in years is a 2D side-scroller. There, we said it. This sneaky spin-off crept out to little fanfare, but it's an absolute breath of fresh air for a franchise that needed one more than most. The robes, the Templars, the haystacks, they're all here — but there's no danger of this unexpected little gem blending silently into the crowd. *Chronicles* is more of a true stealth game than you might have come to expect from the series. As Chinese assassin Shao Jun, your goal is to use your acrobatic skills, Animus powers, and a modest collection of gadgets to make your way as quietly as possible through some surprisingly expansive levels. While there is a detailed combat system, chances are that a straight-up fight won't end as well for you as it tends to for Ezio Auditore. Even if you do survive, you'll be sure to take a hefty knock to your final score.

One particularly clever new mechanic, though, is the guards' colour-changing vision cones. When the coast is clear, they're white, but if you're spotted they turn yellow, and the enemy will start to take an interest. As they investigate, the cones slowly fill up with red — if you let the red touch you, then your cover is well and truly blown. That kind of smart visual feedback is key to a game like this, and *Chronicles* is fantastic at making you feel like you've always got all the information you need to get the job done.

None of that feedback ever gets in the way of some seriously pretty looks either, with painterly brush strokes that make you feel like you're dashing through an ancient work of art. The setting, 16th century China, is wonderfully evocative, and your blood-stained path through the world will take you to all the landmarks you'd expect, including the Forbidden City and the Great Wall.

The game's weak spot, unfortunately, is the story. Protagonist Shao is about as forgettable as they come, and her tale is one of generic revenge, MacGuffins, and broody monologues. Even as a flimsy framework for the action, it's disappointing.

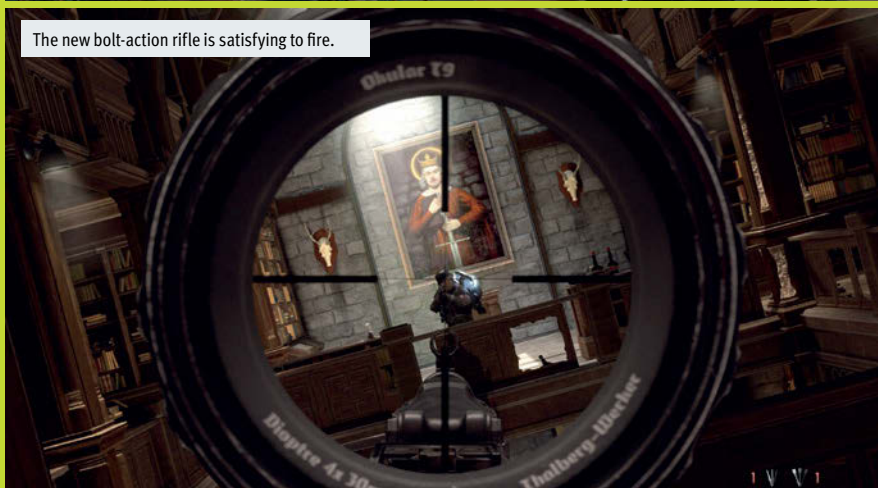
We can forgive that one hiccup, however, given the strength of the core gameplay. This is the first entry in a planned trilogy, and though the cliffhanger ending had us rolling our eyes, we're still eager to get our hands on the rest. This is a refreshingly different *Creed*.

[ROBIN VALENTINE]

From US\$9.99
PC, PS4, XO
assassinscreed.ubi.com



A lot changes between 1940 and 1960.



The new bolt-action rifle is satisfying to fire.

Wolfenstein: The Old Blood

TAKE A TRIP BACK IN TIME, REPLETE WITH ZOMBIE NAZIS.

\$39.95
PC, PS4, XO
www.wolfenstein.com



A standalone prequel to last year's excellent *Wolfenstein: The New Order*, *Old Blood* marks a return to the classic shooter's traditional ideas. It's a strange creative shift. *The New Order* proved it was possible to separate BJ Blazkowicz from *Castle Wolfenstein* and still create something that felt like a *Wolfenstein* game.

The Old Blood is far more familiar. It's set in 1946, involves both a return to and an escape from *Castle Wolfenstein*, and plays out the consequences of Nazi occultism in a manner that will feel eerily familiar to anybody who has played *Return to Castle Wolfenstein* or Raven's 2009 reboot of the series. I was happy to see the series move away from gothic castles and gunfights in crypts. Yet here we (and they) are.

MachineGames' particular sense of style has survived. The new *Castle Wolfenstein* is lovely to look at, a brutal marriage of *Helm's Deep* and *Half-Life 2's Citadel*. That said, what was novel a year ago isn't necessarily novel now. Nothing in *The Old Blood* exceeds what was achieved in *The New Order*, and there are moments when the two are uncannily similar. There's even a bit where you're confronted by a senior female Nazi while carrying a tray of drinks. This is clearly deliberate, but now doesn't feel like the time for the series to put out a greatest hits album: it only just made a case for its continued relevance.

The Old Blood shares *The New Order's* impactful gunplay but lacks its predecessor's

pace and variety. A forced stealth section near the beginning lasts long enough to become irritating; what follows alternates between running gunfights, open-ended arena encounters and defence sequences with little escalation. Its high points are, as before, the moments when it lets you take on a room full of Nazis as loudly or quietly as you please. For every arena that makes the most of that freedom, there's another that is too small, too linear or too prescriptive to really deliver.

The introduction of the supernatural doesn't add anything you haven't encountered in a hundred other shooters, including more than one prior *Wolfenstein* game. There are new weapons, but the majority of these are reverse-engineered versions of guns from *The New Order*, downgraded to match the '40s setting. The sawn-off shotgun is gratifying to use, at least, and a new grenade-launching pistol provides an impactful panic button.

The Old Blood is a false start for *Wolfenstein's* life after *The New Order*, a creative step backwards that survives primarily because of the strong groundwork laid in the previous game. It will always be fun to fire these guns and MachineGames' presentation is still ahead of the curve, but this isn't the game you should play if you want to explore those qualities — that game was released a year ago.

[CHRIS THURSTEN]

We're not sure what's more impressive here, the chest muscles or the laser beam eyes. Both are tremendous.



Mortal Kombat X

A MUSCULAR UPDATE THAT FEELS MATURE WITHOUT LOSING TEENAGE KICKS.

From \$79.95 | PC, PS4, XO |
www.mortalkombat.com



We're engrossed in story mode, trying to understand why Sub-Zero is evil. A colleague scoffs and asks: "Who plays *Mortal Kombat* for the story?" Prepare your surprise-o-meter, scoffing colleague: the sudden and shocking answer is 'everyone'. For 23 years, this series was defined by its ability to make monocles fall out in shock. *Mortal Kombat X* represents it maturing like violent cheese, adding narrative but losing neither the fun nor fatalities.

For the first time, characters are more than just naked wobblers and symmetrical sculpted torsos. It plays like a gleefully violent '80s action film, albeit one with occasional QTEs to keep your thumbs buzzing. Every conflict ends with fist meeting face, but there's poetry tattooed on the knuckles. Think pro wrestling, but with Elder gods and evisceration. It forces you to engage with characters you didn't know you cared about — you'll come for the quips and shadow kicks, but stay for the drama.

Of course all this would be meaningless if the fighting sucked. Great news: it doesn't! It sounds like milky, diluted praise, since *Mortal Kombat* traditionally favoured shock value over skill, but the scrapping is the best it's ever been. Combos are directly related to input, and moves flow in an intuitive, *Street Fighter*-reminiscent manner: you throw together a few standard attacks and instinctively add a special onto the end — the bleeding cherry on a broken nose cupcake. Likewise, all specials can be buffed using the

super meter, offering expanded options for tactical play. This bar can also be used to break any of your opponent's combos, but it's costly, using up two sections of charge. This means every match has the chance to swing back and forth, as you decide between pummelling offensive and reactive defence.

As well as this, each fighter has three variations. *Deadly Alliance* did a similar thing by equipping each fighter with three play styles, but it's more subtly done here. They're similar enough that switching them never feels confusing, but it enriches the roster and adds a cool rock-paper-scissors element.

It's also a deeply comic experience. It gleefully references obscure *MK* lore, but is always inclusive. If you've played any *Mortal Kombat* game, there's a joke here crafted specifically for you. Funnier still are the fatalities, which hit the sweetbread spot between splatter flick and slapstick — hilarious, rather than horrible.

But for the first time in the history of the series, *Mortal Kombat* is shocking for reasons beyond violence. It has the best story mode of any fighting game, and character design that's subtle without being staid. It's still more about what happens at the end of a fight than during it, but take away the popped eyeballs and it's still a compelling beat-'em-up. *MK* hasn't grown up, but it's certainly come of age.

[MATT ELLIOTT]



CHROMA SQUAD

GO GO RIP-OFF RANGERS!

We haven't played a game this cheerfully meta since we developed *Game Dev Story* in *Game Dev Story*. Yes, in screenshots Behold Studios' super sentai-in may look like 'merely' a game about turn-based battling with knock-off Power Rangers, but it actually casts you in the musty costumes of five skint stunt actors filming a knock-off of Power Rangers. This mightily morphs how the game plays out on a number of levels. Take the combat: true to the show's formula, you'll spend most episodes in fisticuffs with spandex-clad goons and colourfully costumed bosses, then take to a stocky mecha to punch the monster of the week out for good. Between episodes, however, you also have a studio to run. That means everything from answering fan mail to hiring agencies to sell your toys. Impress viewers and the group's money troubles end around season three, though by this point you'll have realised that the game's more important economy is the crafting materials that fall from defeated minions. All it takes is a little cardboard and silver tape and you've got a powerful new punching arm for your giant robot. It's a satisfying accompaniment to the light, bubbly on-set strategising and cheeseball storyline. The problem, however, with emulating a show built to formula is that things inevitably end up a little repetitious. The scenery shifts and the cues change, but that only goes so far across season after season of battling samey legions of red-eyed putty stand-ins. Mech fights, meanwhile, rapidly feel insubstantial; a simple try-your-luck combo system for hits and timing minigame for defence saved only from flimsiness by a few flashy special abilities. And while the script pokes fun at the intentionally terrible grammar of the narrator, there are enough genuine typos throughout to make the joke backfire. But *Chroma Squad* was never intended to be taken too seriously or binge-watched, and most of these issues fade with adequate screen breaks. What's more important is that Behold's game is no poser, but rather a guilty pleasure that does more than just trade on its multi-coloured touchstones. It may never be zord — sorry, lord — of the turn-based strategy genre, but its easy-going charm should win it plenty of fans.

[MATTHEW CLAPHAM]

US\$14.99
PC, Mac, Linux
www.chromasquad.com





The latest *D&D* Edition (5th) has beautiful non-sexualised art. The ladies, finally, wear armour.

STEVEN 'BAJO' O'DONNELL

is a video game critic and co-host of ABC shows *Good Game* and *Good Game Spawn Point*. His love of games is only surpassed by his love of cats.

[ROLL THE DICE!]

The history of the RPG

ROLE-PLAYING VIDEOGAMES EXIST BECAUSE OF DUNGEON & DRAGONS. BUT WHAT IS D&D REALLY ABOUT, AND HOW HAS IT INFLUENCED VIDEOGAME RPGS AS WE KNOW THEM TODAY?

[STEVEN 'BAJO' O'DONNELL]

SO HOW DOES D&D actually work? It's hard to explain, if you haven't sat in on a session. D&D is a pen and paper tabletop game. Gameplay is about rolling for attacks, making and reacting to creative choices in character, teamwork and most of all, an unfolding story. It's played with dice, miniature figurines, and an overlording Dungeon Master or 'DM'. The DM plans out the adventures and plays villains, and NPCs that pop up along the way. Five or so people sit in a room. The DM will explain what the party are seeing in front of them. Then it's up to the party to make choices about what to do next. A rogue might look for traps, a mage may suggest the team rests so they can regen spells and prepare for oncoming encounters. Or a fight might break out within the group itself, which happened in a recent game of mine. A barbarian made a decision and we all needed

to stop him, so it got player-vs-player violent.

D&D started in the mid-70s, and it was widely regarded as something that was only played in the dirty, dank, dark hovels of the ultra-nerds. These days, even my most hipster of friends play D&D. Although, they mostly just take photos of their characters.

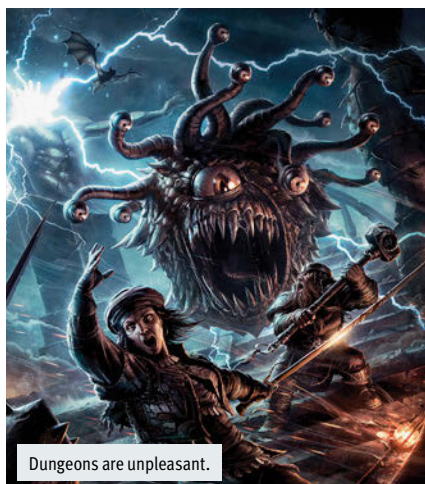
If you've never played D&D, it's understandable. It's not something where a handful of newbies can jump in, pick it up in one night and have a good time. I've only been playing for 6 months and I'm still learning. Others in my group have been playing for over 15 years, and still love it. You would be surprised how much fun it actually is to role-play, even just a little. Don't fear the role-play, dive in.

D&D is about freedom of choice and getting creative. These are the things video game struggle with the most. It's hard to let gamers be creative

within a story based game, because they usually end up just killing everyone. Even the most beautiful of choice consequence RPGs like BioWare's *Mass Effect* and *Dragon Age* series, or Bethesda's *Skyrim* and *Fallout* games, still have a fixed structure and limited outcome. But when it comes to combat, games are far superior. A simple fight with a troll and a few goons in tabletop D&D can take an hour to get through. In a video game, it could be done in seconds.

When I ask people what kind of games remind them of D&D, *Planescape Torment* is usually the first answer. It was released in 1999 and is widely considered one of the greatest RPGs of all time, and about as close as you can get to real life D&D. It was full of creative design and stories.

Baldur's Gate 2 is another of the greatest RPGs of all time, released in 2000. It's visuals were stunning, the gameplay was exciting and the



Dungeons are unpleasant.



An 'Enhanced' edition for *BG2* was released in 2013, with widescreen and tablet support.



My D&D crew! We are called 'The Midnight Dragons'. Yes, that's actually the best name we could think of.



This is my 'Warforged' D&D character which I named 'Grindr'. Hero Forge has a superb interface for designing your own characters, 3D printing them for you, and delivering it! www.heroforge.com

overall craftsmanship behind it lead to more 'spiritual successors' than any other game I can think of. It also let you import save files, and had multiplayer.

Neverwinter Nights is ANOTHER greatest RPG of all time. Except this time, you could play online with loads of other adventurers. Servers could support 96 players! You could make your own areas, towns, taverns, quests, wilderness, dungeons. DMs could link servers together. This allowed custom content makers to build huge worlds and then, using the Game Master mode, take control of NPCs on the fly or add monsters.

Next time you're hunting deer in the sprawling, majestic wilderness of *The Witcher 3*, or dying again and again in a *Bloodborne* chalice dungeon, or creeping forward turn-by-turn in *Legend of Grimrock*, spare a thought for those who started it all. Those brave men and women, huddled around paper maps and multi-sided dice so long ago. Those DM's who created stories

which inspired developers to go and make the games we love. They are the true heroes, of dungeons.

But enough about the old. In with the new! What kind of D&D games are about right now? I've mentioned *Neverwinter* in previous articles. It's a solid free to play MMO, although it's starting to show some signs of aging in 2015. But it allows you to create your own custom dungeons at least.

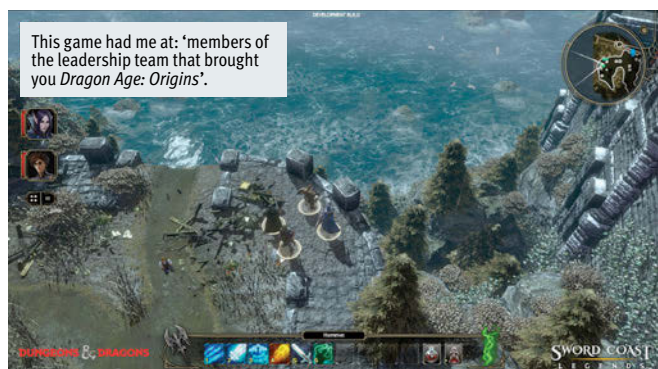
Pillars of Eternity is the most D&D game around at the moment, and it's not even licenced as D&D! A beautiful top down adventure, full of excellent stories and choices. Combat is thrilling, and deep. Don't be afraid to play on easy (I did).

Fantasy Grounds is a (now officially) licensed D&D adventure creator which essentially lets you play tabletop D&D online. It's fantastic if you have a DM who knows what they're doing and it also automates some of the mechanical components of D&D for everyone. It also lets you

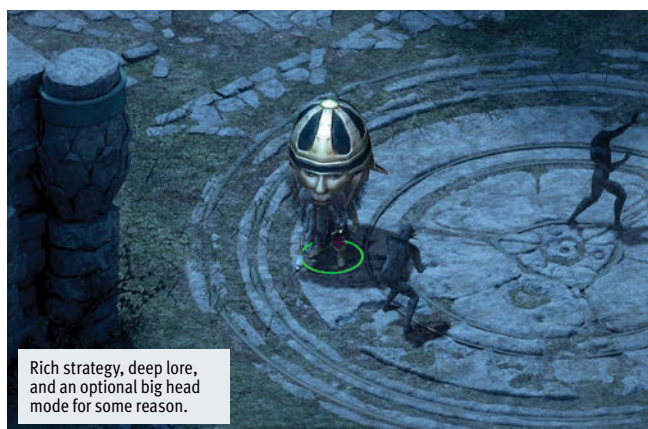
emote without saying it, in the game chat which I particularly like. Only the DM needs to actually buy the game, the other players can use the demo to play fine. The best part about this D&D interface besides being good for remote play, it lets you have everything on your screen at once. Character information, map, character placement — the lot! (And you can scroll imgur in the background when it's not your turn).

Due out sometime this year, *Sword Coast Legends* aims to create a true D&D experience with its own Dungeon Master mode. It looks beautiful.

Due for beta testing sometime in 2015, *Torment: Tides of Numenera* is from the makers of *Wasteland 2*. It's a game 'crafted in the torment tradition.' There is some real talent behind this, and it shows if you are a developer and even say the word 'Torment' in a sentence, 90s gamers just generally flip out. ■



This game had me at: 'members of the leadership team that brought you *Dragon Age: Origins*'.



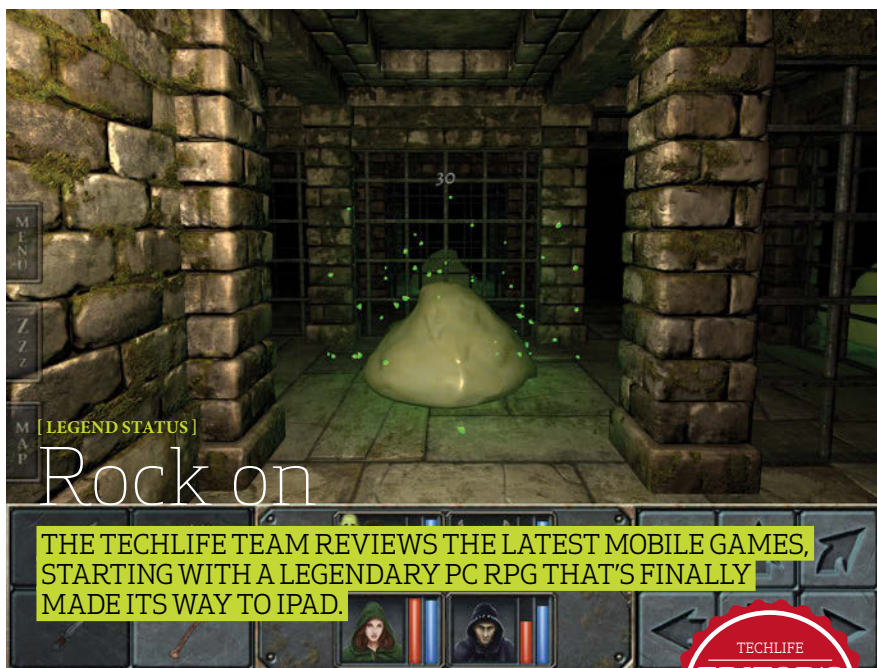
Rich strategy, deep lore, and an optional big head mode for some reason.



It's surprising how these windows of stats and simple map can create such complex and memorable stories.



Torment raised a whopping 4.8 million dollars in crowdfunding support. People really want more CRPGS.



[LEGEND STATUS]

Rock on

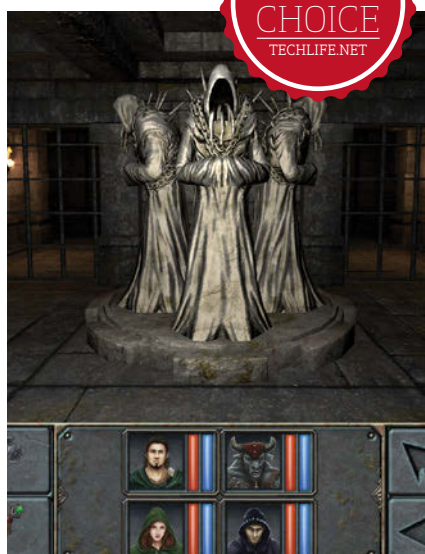
THE TECHLIFE TEAM REVIEWS THE LATEST MOBILE GAMES, STARTING WITH A LEGENDARY PC RPG THAT'S FINALLY MADE ITS WAY TO IPAD.



[IPAD]

LEGEND OF GRIMROCK
HACK, SLASH, LOOT, THINK.
\$6.49 | www.grimrock.net

TECHLIFE
EDITOR'S
CHOICE
TECHLIFE.NET



LEGEND OF GRIMROCK first landed on PC and Mac back in early 2012, and while an iPad version was promised to be in the works soon after, it's taken a full 3 years for it to finally arrive. The good news: it was absolutely worth the wait. This homage to early-90s RPGs of yore — games like *Eye of the Beholder* and the *Wizardry* series — is a party-based first-person affair, with old-school tiled dungeons where your movement is restricted to a grid of set squares. Unlike this step-by-step movement, however, combat in *Grimrock* takes place in real time, meaning you'll need reflexes as well as strategy to avoid enemy attacks — it's not uncommon to strafe out of the way of a hulking ogre that's charging at you from the other side of the room. In battle, you'll face off against giant spiders and snails, tentacled beasts, flaming knights and crawling scaly critters, but *Grimrock's* real core is its devious and



mentally-taxing puzzles, which require a bit of trial and error and, occasionally, scouring nearby walls for hidden switches. Character levelling is kept deliberately light: your party of four unlocks new spells and skills as they level up, but you don't get bogged down by the need to micro-manage fine details. While it's fairly light on story, *Grimrock* is otherwise a near-perfect balance of combat, exploration, puzzles, looting and levelling. This is an extremely polished old-school RPG with clockwork precision to the design — and it looks great on iPad too. At this \$6.49 price, it's also an absolute steal.

[DAN GARDINER]

4½



[IPAD]

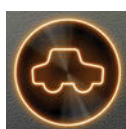
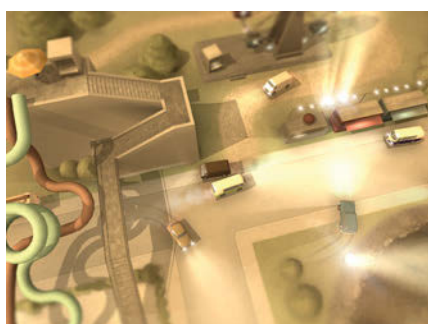
GUNPOWDER

NOT THE EASIEST WAY TO OPEN A
SAFE, BUT THE MOST FUN.
\$6.49 | gunpowdergame.com

Destruction is fun — just ask any kid who's got a bit bored with their LEGO creation, or an adult who's braved the cold to watch a demolition. Here, you're laying trails of gunpowder to ignite kegs and make safes go boom, supposedly taking the money to give to the poor, like a pyromaniac Robin Hood. Dragging your finger across the screen lays a trail of the powder, and you're given extra kegs to lay, cannons to fire, trains to dodge, or any combination of these and more. Watching the chain reactions go off is satisfying, like triggering the endgame in a round of *Mouse Trap* — except the mouse ends up as paste. It starts simple, but soon builds to a stern challenge when gunpowder stocks are limited and you need to set up a convoluted sequence of explosive events. You're scored on how much powder you have left at the end of a level, whether or not you met the time target (often sadistically tight), and how many of the three piggy banks you've managed to blow up. These serve the same function as *Cut the Rope's* stars — optional, but you'll be damned if you're not going to scrape together a strategy to get them all. The one frustration is that successfully placing a keg so that its blast radius spans a river (gunpowder shouldn't get wet, for obvious reasons) can be a matter of a few pixels, which isn't easy when your view is obscured by your own finger. As iOS puzzlers go, though, this is a real blast.

[EMMA DAVIES]

4



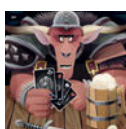
[IOS, ANDROID]
DOES NOT COMMUTE
A WHEELY GOOD PUZZLER.
Free with IAP | www.mediocre.se/commute

THERE'S MORE THAN a few shades of the classic *Flight Control* in *Does Not Commute*, but this little charmer does more than swap planes for automobiles. It's your job to get a string of commuters to their destination across seven different maps, and each driver has their own backstory that fleshes out what would be a dry experience. All the vehicles automatically accelerate — all you need to do is steer them. The first few vehicles are easy enough — get them from point A to B and their path is set. Then the next vehicle comes along and it is inevitable that its path will cross with the one that came before it. Then add another 17 cars, trucks, buses, and fire-engines and you're in knots. While it's technically possible to finish the whole thing without paying a single cent, an optional in-app purchase (for around AU\$2.50) enables checkpoints, meaning you can close the app and come back to the last map you were on without starting the whole thing again.

[PAUL TAYLOR]

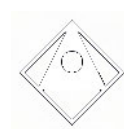
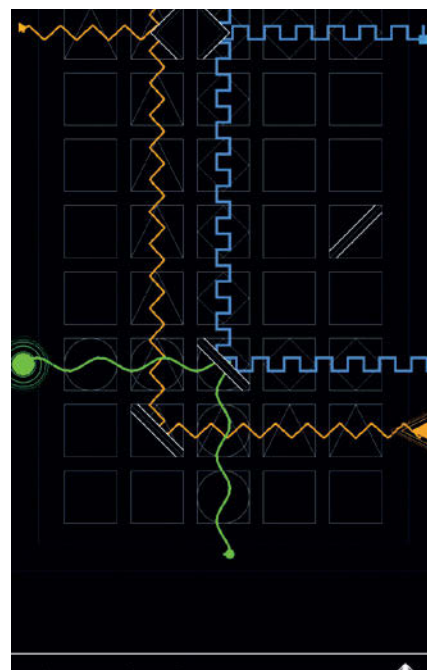


[WWW.TECHLIFE.NET]



[IOS]
CARD CRAWL
FANTASY ADVENTURE IS A SOLITAIRE-
OCCUPATION.
\$2.49 | cardcrawl.com

CARD CRAWL TURNS fighting monsters and collecting treasure into a super-light card game (run by an adorable beast-man in a tavern). The rules are easy: each turn, up to four cards are dealt in front of you. Once you clear three of them, more cards will be dealt. Get through the entire deck and you win. The trick is that there are six types of card: monster, swords, shields, treasure, potions and special abilities. The game involves managing the other card types in order to deal with the monster cards, while collecting as much treasure as possible. Each card has a number denoting its potency. On monster cards, it's how much life the card has, as well as how much damage it will do. To clear a monster card, you must either kill it with swords, or let it attack you (though shields can absorb its damage). You can hold certain cards in your hands, removing them from the four that you're supposed to be clearing, which moves the game on and lets you decide when is best to use them. Do you save a strong potion to heal yourself in case a high-numbered monster appears, or do you use it now to make space for a sword? A round will be about five minutes of tense fun, gambling with your precious strong cards and aiming for flawless runs. We love it, although we'd like some more play modes for variety. [MATT BOLTON]



[IOS, ANDROID]
TOUCHTONE
HACK YOUR WAY THROUGH THESE
SMART PUZZLES.
\$3.79 | touchtonegame.com

Puzzle games don't often carry a weighty, hard-nosed story, but *Touchtone* makes it work. As an analyst at an intelligence agency, you must decrypt messages by figuring out puzzle screens. The premise is simple: coloured lines stream in from the edges of the screen, and you need to direct them to identically coloured receiver spots by moving tiles that redirect or split them into their path. This isn't the most original conundrum in the world — it's a more elaborate version of the light/mirror puzzles featured in many adventure games — but it's been done very well. A key part of the challenge is that moving one of the redirecting tiles means sliding the entire row or column that it's on, so even when you can envision where everything needs to go, it can be difficult to work out how to get them there. There are no time pressures, though, so you can take your time to stare, experiment, drift off and come back — perfect for lazy weekends. Yet still... only partially engaging, really. The drive in *Touchtone* comes from the story. It starts by throwing you straight into the moral ambivalence of trying to judge whether someone's communications paint them as a potential threat or not, then quickly starts to throw in ideas of jealousy, politics and abuse of this power. It's a narrative that aims to make you consider your privacy in a digital age, and looks at how the flaws of humanity play a part in even ostensibly objective systems.

[MATT BOLTON]



TEST BENCH

THE HOTTEST GEAR PRESSURE-TESTED



[BEND IT LIKE BECKHAM]

The hybrid gets classy

THE TECHLIFE TEAM TESTS THE LATEST GADGETS, PCS AND ACCESSORIES, INCLUDING DELL'S NEW 13-INCH LAPTOP/TABLET HYBRID.



Dell Inspiron 13 7000 Series 2-in-1

ONE STYLISH LAPTOP-TABLET HYBRID AT A RATHER KEEN PRICE.

DELL'S NEW 13.3-INCH 2-in-1 is the laptop/tablet hybrid that wants you to have it all. It's able to operate as a well-featured ultraportable notebook (including a rather MacBook-like silver colour scheme — although here it's plastic rather than aluminium) and comes stocked with three USB ports (two 3.0), a full-sized HDMI out, SD card reader and a 3.5mm headset socket. Flip the screen around, though, and you have a sizeable business tablet, including stylus, for tasks where you'd rather use touch. This top-spec model also packs speedy parts inside: a dual-core 2.4GHz Core i7 CPU, 256GB Samsung SSD and 8GB of memory. This'll handle day-to-day tasks with aplomb, and can even handle a little photo and video editing on the side. It's only really gaming where you'll notice any slowness — here, the Intel HD Graphics 5500 chip can't really handle anything more than casual play.

There's some good overall design on display here though, such as the elegant and straightforward hinge mechanism that means switching from laptop to tablet modes is quite stable and smooth, and the glossy, soft-touch plastic finish on the chassis makes for a classy feel

in the hand. The backlit chiclet keyboard and large trackpad are both first-rate, closely resembling what you'll get with Apple's class-leading MacBooks.

That said, this is a bigger 2-in-1 than we often see, with that 1080p 13.3-inch display surrounded by medium- to large-sized bezels, which all add to the overall footprint — the bezel below the screen is a good 3.5cm, for example. Still, it's reasonably portable at 1.6kg, and the charger is likewise quite a compact little job, although we wouldn't want to have to hold it up in tablet mode for more than a minute or two.

The aforementioned stylus is a bit underwhelming in places, sadly. Rather than the fine-tipped stylus that you'll get with Microsoft's Surfaces, this one has a rubbery nib about the size of a matchstick head. While it gets the job done, it's not quite as precise or stable to write with — although it can at least be safely stashed inside the Inspiron, thanks to a slot on the right-side of the base.

With the Core i7 processor, Dell's had to outfit this one with an exhaust fan in the back behind the keyboard, although it's thankfully reasonably quiet in operation.

That price is quite reasonable too, and if you can't stretch to this high-end model, there's an entry-level alternative for a rather affordable \$999; you'll have to put up with a lower-res screen and a Core i5 processor though.

All up, this is a very attractive 2-in-1 and while it could be better in a few places, it gets a lot more right than it does wrong. A good-value offering at this price.

[DAN GARDINER]

DELL INSPIRON 13 7000 SERIES 2-IN-1
\$1,700
www.dell.com.au

CRITICAL SPECS
Windows 8.1 (64-bit), 13.3-inch IPS LCD screen @ 1080p, Intel Core i7-5500U processor, 8GB RAM, 256GB SSD, Intel HD Graphics 5500, 3 x USB ports (two 3.0), HDMI out, SD card reader, 1.6kg.



Microsoft Lumia 640

SLEEK WINDOWS HANDSET.

THE LUMIA 640 is a smartphone that you can't miss. Literally. This Windows Phone has a glowing orange or bright powder blue exterior and at a glance you would be forgiven for mistaking the Lumia for a top of the line smartphone. Its big 5-inch full-HD screen displays bright colours and crisp pictures and the loud case is undeniably ostentatious, but less offensive than you might think. With well placed power and volume buttons, a nice ergonomic feel to it and a speedy interface, the 640 may even be able to coax you along a little further. If at this moment you're told that it has a price tag of only \$299, then you may just think that Microsoft harnessed some voodoo in its successor to the Nokia Lumia 635.

Behind this impressive veil though is a phone that is much more in line with what you would expect from a \$299 smartphone. The Lumia 640 is fitted with a 1.2 GHz dual-core Qualcomm Snapdragon 400 processor and 1GB of RAM, putting it in line with current budget Android phones. Its notable weak point is processing power; rendering 3D games on the 640 isn't overly impressive — even amongst processors of equivalent speeds.

Still, that \$299 price does include a 12-month subscription to Microsoft Office 365, which is otherwise worth around \$90 on its own. The option to expand your storage via microSD is also welcome, especially considering how quickly the 8GB of built-in space fills up.

Battery life is likewise good, delivering over 10 hours of continuous video playback in our testing, and 4G connectivity means web surfing and downloading apps on the go is fast and responsive. While Microsoft has saved some money in places, overall the Lumia 640 strikes a good balance. The new Windows 10 operating system is expected to bring with it a ton of Android and iOS apps — thanks to Microsoft making it easy for developers to port existing apps onto the Windows Phone platform. With Windows 10 just around the corner it's not a bad time to purchase a Windows Phone, and as far as they go the Lumia 640 is a bargain.

[JOEL BURGESS]



LaCie Mirror

MIRROR, MIRROR ON THE WALL, WHO'S THE SHINIEST HARD DRIVE OF THEM ALL?

HARD DISKS ARE never the most exciting devices, but LaCie works hard to come up with unusual designs that make their hard drives a bit more interesting. In the past they've produced hard drives that look like silvery spheres and metallic sculptures, and now they've come up with the eye-catching Mirror.

It's entirely covered on all sides with gleaming, reflective glass and is relatively chunky when compared to some of the latest portable drives. However, it only weighs 230g, so it's still slim and light enough to slip into a backpack with no trouble at all.

You don't have to worry about dropping it, as LaCie has used tough Corning Gorilla Glass to protect the exterior. The only things it can't seem to resist are sticky finger marks, but LaCie includes a cleaning cloth with the Mirror. There's also a carrying pouch and even a smart little ebony stand for when you want to sit the Mirror on your desk.

The drive's performance is respectable enough, with the USB 3.0 interface averaging around 100MB/s for both read and write speeds. That's not going to break any records, but it's in line with a number of other portable drives we've tested recently. LaCie also bundles some handy backup and encryption software too.

The only real drawback is the price — it's seriously expensive, with 1TB of storage costing a hefty \$400. To be honest, it's more of a fashion statement than a computer accessory — but then, the name makes that pretty clear from the get-go.

[CLIFF JOSEPH]



MICROSOFT LUMIA 640

\$299
microsoft.com



CRITICAL SPECS

Windows Phone 8.1 with Denim (upgradable to Windows 10 for phones), 5-inch HD IPS LCD screen @1,280 x 720-pixels, 1.2 GHz dual-core Snapdragon 400 processor, 2500 mAh battery, 8MP rear camera, 1MP front camera, 8GB storage, microSD up to 128GB, 4G compatible.



LACIE MIRROR

\$400
www.lacie.com



CRITICAL SPECS

1TB, USB 3.0, 230g



Mophie Juice Pack Air

IS THE JUICE WORTH THE SQUEEZE?

When it comes to kicking a bit of extra life into your smartphone, Mophie's range of protective, battery-extending iPhone cases are hard to beat. Packing 100% more battery into its lightweight and compact package, Mophie's Juice Pack Air case fits an iPhone snugly into its tough-but-gentle shell. A lightning connector at the bottom of the case lets you simultaneously charge your case as it charges your iPhone, and the LEDs on its back show you how much 'juice' it has left. With its smooth, soft-touch plastic and matte finish, it's also the most attractive case of its kind.

[STEPHEN LAMBRECHTS \



ASUS ZenBook UX305FA

A MISSED OPPORTUNITY.

BACK IN THE Christmas issue of *TechLife*, we gave a stellar review to ASUS's ZenBook UX303LN and so, naturally, we were expecting big things from this sort-of follow-up, the UX305. Wrapped in a shiny black stainless steel chassis with a matching matte metal screen-trim and keyboard-surround, there's a lot to appreciate in this new, more sedate exterior design. What's still clear is just how portable this ZenBook is, with 12.3mm of girth and a 1.2kg total weight, the UX305 looks and feels like an impressively-built Windows counterpart to the MacBook Air.

But peer a little harder and that initial impression doesn't quite hold up. See, the UX305 is packing one of Intel's latest range of Core M processors, specifically the 1.2GHz dual-core M-5Y71. Apple's used the same type of Core M chips in its new petite 12-inch MacBooks, but the problem with the 13-inch ZenBook UX305 is one of size: this is much bigger than Apple's new MacBook, and shaving off a few millimeters of thinness from previous ZenBooks doesn't really make sense when it comes at the cost of processing power. Of course, the UX305FA will surf the web and has ample grunt to run office apps like Excel and Word, and even do some light image editing. But in some senses that 'laptop' appearance is a bit deceptive, particularly when it comes to gaming performance. The older UX303LN, with its Nvidia GPU, is about four times faster in this area.

The ZenBook UX305 does have some redeeming features, however. The chiclet keyboard is definitely a step up from the average, with stable and tall keys that feel great to type on, and although the trackpad does occasionally feel as though you're dragging your finger through mud, it's mostly manageable. The screen is a little mixed. Although it's a full HD 1080p IPS number — with nice rich, full colours — the matte anti-glare coating does add quite a bit of sparkle to images, especially when displaying lighter colours. Six hours of battery life when web surfing isn't bad either — although to put it in perspective, it's almost half what the smaller MacBook achieves.

The UX305 is one of the thinnest laptops on the market, but when you consider that its performance is a little behind a two-year old 2013 MacBook Air (which you can pick up refurbished for under a grand) the ZenBook's street price of \$1,299 is a little harder to justify. As it is, we'd recommend forking out a few extra hundred for the more versatile UX303LN.

[JOEL BURGESS]



MOPHIE JUICE PACK AIR

\$99.95
www.mophie.com

CRITICAL SPECS

2750mAh battery, on/off switch, supports charge and sync, 99g.



ASUS ZENBOOK UX305FA

\$1,299
asus.com/au

CRITICAL SPECS

Windows 8.1, Intel Core M-5Y71, 128GB SSD, 4GB LP DDR3 RAM, 13.3-inch IPS display @ 1080p, SD/SDXC card reader, 720p webcam, 3 x USB 3.0, mini-HDMI, 45Wh lithium-polymer battery, 1.2kg.





Panasonic Lumix DMC-GF7

THE COMPACT SYSTEM CAMERA GETS AN UPGRADE.

PANASONIC'S LUMIX GF series compact system cameras are aimed at novice photographers, and the new DMC-GF7 uses the same Micro Four Thirds format sensor format as all of Panasonic's compact system cameras (and Olympus'). The pixel count of the GF7 remains the same as the GF6 at 16 million pixels, but the sensor itself is upgraded to the model used in a camera much further up the Panasonic range, the GX7.

Whereas the GF6 came supplied with a 14-42mm kit lens — fairly large compared to the size of the body — the GF7 ships with the smaller, collapsible 12-32mm kit lens. Although this does mean you lose some focal range, it makes the overall size of the camera much more pocket-friendly, something that's always welcome.

Of course, none of that is as important (ahem) as the new "selfie screen." This can be flipped upwards through 180 degrees, and when you do this the camera automatically switches to Selfie mode. In Face Shutter mode, the wave of a hand in front of a face triggers the shutter, while Buddy Shutter mode is designed to help when taking selfies with friends.

The camera's sensor reproduces detail really well, and examining an image at 100% shows how much fine detail has been captured. At lower sensitivities, such as ISO 200, detail is particularly well defined. As you move up the sensitivity scale towards the higher values such as ISO 3200, you can see some smoothing and loss of detail if you examine pictures at 100% magnification.

For the creatively minded, there's a host of great options available, and we continue to believe that Panasonic offers the best, and most interesting, range of digital filters — and the fact that you can shoot them in raw format is welcome.

Using the GF7 is easy, and with its super-responsive touchscreen, setting the autofocus points and other settings is a doddle. There's no viewfinder but the focus doesn't suffer too badly from glare even in bright sunlight. The autofocus is super-quick in a range of lighting conditions, the GF7 is fast and responsive to use, and the automatic white balance and exposure modes generally result in very pleasing images, too.

[AMY DAVIES]



Microsoft Universal Mobile Keyboard

A BLUETOOTH KEYBOARD OFFERING SOMETHING FOR EVERYONE.

THIS KEYBOARD IS deceptively simple. You have a small case that is half keyboard and half a magnetically connected panel, with an odd-looking ridge built into it. It's this basic-looking ridge into which you're able to angle any tablet or phone that's up to 10mm thick. This also offers two positions. The first is mostly upright and the second gives a suitable 45 degree tilt, which should suit most situations.

We tested this out with the Nexus 7, Nexus 5 and an Apple iPad mini. It worked pretty much flawlessly. As mentioned, the support panel is held magnetically in place, so it can be removed for standalone viewing or more leisurely typing at a distance. We've tried this out in bed, in the back of a car and on various train trips. It works amazingly well in a variety of unpleasant and uncomfortable situations. We've also taken to having the Nexus 5 and 7 next to each other in the holder, for an odd hybrid dual-screen system that is clearly just showing off.

But you're not going to pay \$70 for a tablet holder. No one would. Luckily it just so happens that attached to this is a Bluetooth keyboard and a rather swanky one at that. There's a device-pairing button along the side of the keyboard, which is our only gripe as we've hit this several times by accident trying to shift the keyboard about. There's also a mode switch to change between Windows, Android and iOS devices. This ensures the special functions work correctly across the different types of device.

In use, the keyboard is excellent. As someone who often writes a few thousand words a week on the move, I can attest to it enabling full-speed touch typing on the go. Being a tad picky, you could say it's a little "plastic" feeling in its action. It's understandably thin for portability, but importantly the low action on the keyboard is ideal for fast typing. It's also a lovely compromise between a full- and reduced-sized design for portability. Microsoft has also managed to keep all the other vital keys present and correct; such as the arrows, Backspace and Delete, Ctrl, Alt, Command and Alt Gr.

We've tried a good number of Bluetooth keyboards over the years, but this just became our number one choice.

[NEIL MOHR]



PANASONIC LUMIX DMC-GF7

\$650 (12-32mm lens)
www.panasonic.com.au

CRITICAL SPECS

16MP Live MOS sensor (17.3mm x 13mm), 3-inch tiltable LCD screen, micro four-thirds lens mount, RAW shooting, video up to 1080p@60fps, 802.11n Wi-Fi, 266g.



MICROSOFT UNIVERSAL MOBILE KEYBOARD

\$69
www.microsoft.com

CRITICAL SPECS

Android 4+, iOS 6+, Windows 8+/RT, 242 x 109 x 12mm, 3-year warranty, 365g



Sacred Sound Pro Luxury in-ear earphones

BUDGET BUDS WITH AMBITIOUS SOUND.

IN THE WRESTLE between price and performance, these Pro Luxury buds deserve the championship belt. Refined bass supports ultra crisp, responsive highs and respectable mids, though we'd recommend jumping into your equalizer and bringing the higher frequencies down a touch. Beyond that, these are ready to take straight out of the pack and plugged into whatever you use to listen to your files — just keep the volume a few notches below max. Not because they clip, but because they get loud.

So what's the story? Check out the web site and tucked into the product spiel you'll find that these were designed by "two teenage professional musicians". After a little digging, we found out they're brothers aged 16 and 14. They've clearly thought out what people want (great headphones at a knockdown price) and have delivered it, as sound quality matches the build quality. The curved driver housing is robust, and the flat TPE cable means you can stuff them in a pocket and they'll untangle in a second.

So, for the asking price, surely corners have been cut? Well, yes, but only where it matters least. What this company has saved on a high-end web site and packaging they've sensibly ploughed into producing a pair of well-balanced and refined buds, complete with three sizes of silicon tips and a cleaning cloth.

Recommended? You betcha, though the volume controls don't work on Android devices, only the play/pause/call answer button. As for the iPhone crowd though, ditch your pre-packaged buds and grab a pair of these, pronto.

[PAUL TAYLOR]



Definitive Technologies Symphony 1

GIVE THEM THE SILENT TREATMENT.

IT'S SOMEWHAT IRONIC that the best characteristic of these headphones is how quiet they are — or, more accurately, how quiet the world sounds when you're wearing them. This is thanks to the astonishing active noise cancelling, despite a slight but constant hiss that's always present. Full points to the people in charge of stuffing the padding into the cups, too, as they make the Symphony 1 extremely comfortable. It's a bit like having your head wrapped in a pillow.

However, these cans are miserable for playing music. Harsh, empty higher frequencies limply go hand-in-hand with watery bass and mids. They're a powered set of phones, using an inbuilt rechargeable battery, though if the battery runs out it's still possible to keep playing music by using the inline cord. Say goodbye to all the bass if this ever happens.

Problems persist elsewhere. The Bluetooth connectivity is patchy, as our test unit and usual music player (an Xperia Z1 smartphone) would inexplicably cut in and out. There wasn't any pattern or reason for this happening — sometimes it'd be fine for hours, then we'd have a few minutes of bedlam — and we'd never experienced anything like it with other Bluetooth headphones. Plus, Android users need to use Bluetooth to make full use of the controls, as the track skip buttons were utterly useless when plugged into the cord. Unless you want to pay a premium for silence, we say 'avoid'.

[PAUL TAYLOR]

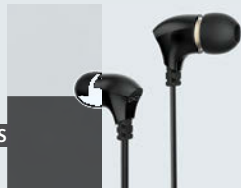


SACRED SOUND PRO LUXURY IN-EAR EARPHONES

\$60
www.sacredsoundaudio.com

CRITICAL SPECS

8mm drivers, 20Hz-20KHz frequency response, 93dB sensitivity, 16 ohms impedance, 1.2m cable, 18g.



DEFINITIVE TECHNOLOGY SYMPHONY 1

\$699
advanceaudio.com.au

CRITICAL SPECS

Bluetooth wireless connectivity, driver size not specified, 8-28,000Hz frequency response, 97dB sensitivity, 32 ohms impedance, 106cm cable, active noise cancelling, 323g.





Audio Technica ATH-MSR7

AUDIOPHILIA FOR THE MASSES.

OUR LOVE FOR Sony's MDR-1R headphones has been well documented in the pages of *TechLife*, both as our benchmark for both long-lasting comfort and bang-for-buck, all-round sound. It seems the gang over at Audio-Technica agree and have created the heavily-influenced MSR7 in response. On the head, there's very little difference between the MDR-1Rs and these, though MSR7's do come with a steeper price tag, are heavier by 50g and have a more aggressive clamp on the melon. Unlike the 1Rs it wasn't too long into the day before we really started to feel the strain.

That said, these headphones sound amazing. Amazing enough to almost be a problem. Crisp, clean and punchy — we don't have enough adjectives to describe just how good the massive 45mm drivers in these memory-foam-clad cans are. To put an emotional value on them, they made us excited about listening to music again. They made us love all the stuff we're into more, and make us want to seek out new music and new genres to find out how they sound. Thick bass, mids, complex strings, splashy highs — these headphones love it all.

The one problem is that anything that doesn't have a decent bit-rate is likely to sound a little dull and flatter than it does through your current set. But feed them something lossless and they're beautiful.

[TROY COLEMAN]



Sennheiser Momentum 2

PORTABILITY WITHOUT COMPROMISE ON SOUND OR BUILD QUALITY

NOW THAT THE smartphone is ubiquitous and you always have your music library with you, headphones are big business.

These new Momentum 2 headphones sit at the upper end of the scale, an over-ear model designed both for listening at home and on the move and they're surprisingly lightweight despite being very well built. The finish is very good too, with stainless steel and leather featuring extensively, and soft ear pads. The two cups can be folded in to make the whole thing easier to transport and less prone to damage, and the hinges and cup adjustment sliders are reassuringly sturdy. The headphones are very comfortable to wear, even for long periods, thanks to their light weight and the fact that they don't press down hard on your ears.

The in-line remote supports Android as well as Apple's iOS devices, and the headphones can of course be plugged into anything with a mini jack output — there's no adaptor for connecting to larger quarter-inch sockets.

The sound quality of the Momentums is excellent. Tested with an iPhone 6, they offered a very clear and detailed soundstage with a rich but not overpowering bass and were as adept with gentler folk tunes as with thundering electronic music. Where a track had a very prominent mid range, usually meaning vocals mixed quite high, they did become slightly bright at the highest volumes. Listening to that thundering electronica also showed that there was very little leakage of sound either in from outside or out from inside even at high volumes, which is good news for the people sitting next to you on the train or your colleagues at work.

These are great headphones, but at this \$500 price they have some strong competition. It's worth comparing with other sets before you buy.

[HOLLIN JONES]

AUDIO TECHNICA ATH-MSR7
\$349
audio-technica.com.au

CRITICAL SPECS
45mm drivers, 5Hz–40kHz frequency response, 100dB sensitivity, 35ohms impedance, 1.2m, 3.0m and 1.2m with mic for smartphones cables, carry pouch, 290g.

SENNHEISER MOMENTUM 2.0
\$499
sennheiser.com

CRITICAL SPECS
16Hz–2200Hz frequency response, 18ohms impedance, 1.4m detachable cable with 3.5mm plug, 240g.

LIGHTS

[HANGIN' TOUGH]

Tough tech torturously tested

LOOKING FOR THE BEST GEAR TO TAKE ON YOUR OUTDOOR ADVENTURES? HERE'S WHAT YOU SHOULD AND SHOULDN'T PACK.

[PAUL TAYLOR]

WE LIVE IN a big country that hits sweltering highs and sub-zero lows. If you're planning to explore it, you're going to need some serious tools to not only survive, but to make it as easy as possible. Talk to any seasoned traveller and they'll say that everything has to have two uses. While a smartphone may be the 21st century's multitool (acting as a web browser, guide book, camera, flashlight, music player, GPS locator and even as a device that can make calls) you'll be very stuck if this all-in-one fails when you're in the middle of nowhere.

Plus, that phrase 'Jack of all trades' has a second line, and that's 'master of none'. To that end, this month we challenged vendors to send us all the other tech you might need while you're out on the road — covering the essentials and luxuries, though some people might argue these are all essential — so that your trip of a lifetime is memorable for all the right reasons.



LED Lenser XEO19R head torch

LIGHT UP ALL THE LAND — FOR A PRICE.

THERE'S A SIMPSONS gag where Homer's giving feedback on his half-brother's invention. He says, "You should have taken an existing product and put a clock in it or something." In 2015, the clock has been replaced by the USB port. Readers, there is a USB port in this head torch so you can use it to recharge your phone. Highlighting that feature alone, though, sells this one a bit short. What you have is a 2,000 lumen head torch that, to our eyes, could help land a helicopter with its strobe function. Everything screams smart design, from the glove-friendly buttons that independently operate the dual lamps, to the levers that alter the diameter and intensity of the beams. It's as tough as they come, rated to IPX6 waterproofing and has a claimed 20 hours of battery life — a gauge on the back indicates how much charge is left in the permanently fixed Li-Ion pack. While we weren't especially frugal when using it, when illuminating the night with lamps on the lowest setting we got pretty close to that maximum run time.



HL014 LED head torch

A POWERFUL AND KEENLY-PRICED, IF FLAWED UNIT.

EVER SEEN A 18,650 rechargeable battery? Us neither, until the cells used in this head torch landed in our backpack. It's a bit larger than a AA-cell and with an identical partner it can power the 1,200 lumen lamp for the best part of a two-week trip. Now, while the torch lacks a bit in convenience, it makes up for that in simplicity... but then sadly loses out again in refinement.

First, the good stuff. While the battery pack is bulky, the whole unit is quite comfortable on the head — important so you don't feel fatigued — and it took all of our abuse with good grace, thanks to the military-grade casing. There's also a red LED integrated into the water- and dust-resistant battery compartment, so you can be more easily spotted.

However, annoying design flaws persist. The power switch is mounted on the rear of the head, and you have to tilt it downward to get to it. The frame the lamp is in gets hot quite quickly too, so if you want to turn the light from low to high to flasher to off, or adjust the focus of the beam, you're going to have to grip a hot torch to do so.

10

TOUGH THINGS TESTED

HOW WE TESTED

We literally threw this gear into a backpack or stuffed it into pockets, then jumped on a motorbike and rode 7,000km to Uluru and back across dirt and tar in two weeks. You want tough? Visit the centre of Australia. Think lots of dust, a couple of bouts of rain, and lots of camping — this gear stood up to the test and all of it came back in one piece.



LED LENSER XEO19R HEAD TORCH

\$445
bnrindustrial.com

CRITICAL SPECS

2,000 lumens, 5,200mAh Li-ion battery, 5V/1A USB output, IPX6 waterproofing, 478g.



HL014 LED HEAD TORCH

\$99
www.ledflashlightstore.com.au

CRITICAL SPECS

1,200 lumens, 50,000 hour LED lifespan, 2 x 4,000mAh rechargeable batteries, 240g.



Nikon AW1

THE INTERCHANGEABLE-LENS CAMERA THAT MIXES ADVENTURE-PROOFING AND HIGH-FIDELITY.

IF YOU'RE LOOKING for an adventure-proof snapper that will take print-worthy shots but only take up a little space in your backpack, the AW1 is worth serious consideration, despite some compromises. First up, it's waterproof to 15m, freezeproof to -10°C and shockproof to 2m. There's a range of additional lenses made for the AW1, and the included 11-27.5mm lens is best suited for close-up to medium-range images. It still does a good job in capturing this country's wide, open spaces, providing bright and bold results. Peer closely, though, and you'll notice noise and fuzziness, though sample 4 x 6-inch prints produced pleasing photographs. GPS tagging is built in, although the AW1 was sometimes stubborn to track the satellites despite clear skies in an open area. It's best to think of the AW1 as a big step up from a tough point and shoot, but still a way off DSLR standards. As a tool for adventure it's near unbeatable, and during our test it never let us down and was good for 200 shots before needing to be recharged.



NIKON AW1

\$799.95
www.nikon.com.au

CRITICAL SPECS

14MP (4,608 x 3,072), 13.2mm x 8.8mm CMOS sensor, 3-inch fixed LCD screen, SD card storage, 160 – 6,400 ISO, 1080i@60fps, 1080p@30fps, 720p@60/30fps, onboard pop-up flash, IPX8 waterproofing, GPS, 313g (camera body only).

Nikon AW130

A FEATURE-PACKED COMPACT SHOOTER WITH A LOT TO LIKE.

WHAT A SURPRISING package this is. Its tough credentials are obvious, able withstand a 2.1m drop, waterproof to 30m and freezeproof to -10°C. However, it's also remarkably versatile and takes great quality photos to boot. And so it should, as it's largely a refresh of the excellent AW120. The sensors on both models actually have the same specs, but the AW130 can be taken an extra 10m underwater, and the barometer has a far higher operating range. In the real world that probably won't make that much of a difference, but what will is the addition of NFC, meaning easier pairing to a smartphone for remote capturing and sharing photos (as long as you download the free app). The GPS tagging function also returns, which is excellent if you're really off the beaten track, as does the micro-USB charging port, helping to cut down on the need to carry additional chargers and cables. Photos are rich in colour and definition, though the face buttons are far too small to be practical — perhaps something for Nikon to fix on the AW140?



NIKON AW130

\$379
www.nikon.com.au

CRITICAL SPECS

16MP (4,608 x 3,456), 1/2.3-inch CMOS sensor, 3-inch fixed LCD screen, SD card storage, 125 – 6,400 ISO, 1080p@25fps, 1080i@50fps, 720p@25 fps, onboard flash, GPS, 221g (including battery and memory card).

Panasonic Lumix DMC-FT30

RELIABLE IF UNINSPIRING.

PANASONIC'S LATEST TOUGH compact camera offers a solid, no-frills approach, taking good quality photos — albeit with a few concessions. The sheer convenience of having a camera with a good physical presence pays off when you're roughing it — particularly when you're taking the kind of risks that could leave a phone with a smashed screen. With the included silicone jacket for extra protection, the FT30 is certainly easy to hold, and the intelligent auto function is smart enough to let you easily adjust settings to suit almost every situation. It needs to be smart, though, as the buttons on the back of the camera that give access to other modes are a bit fiddly to use. The zoom buttons are really mushy, for example, giving almost no feedback — and with gloves on it's even harder to be precise. Still, the FT30 is undeniably tough: it's waterproof to 8m, shockproof up to a height of 1.5m, and freezeproof down to -10°C. It's perhaps best-suited to casual outdoor photography, as pictures can be a little washed out. All up, it's absolutely competent, but a little low on thrills.



PANASONIC LUMIX DMC-FT30

\$224
www.panasonic.com.au

CRITICAL SPECS

16MP (4,608 x 3,456), 1/2.33-inch CCD sensor, 2.7 inch fixed LCD screen, SD card storage, 100 – 6,400 ISO, 720p@25 fps, 480p@25 fps, on board flash, 144g (including battery and memory card).



WHAT TO LOOK FOR WHEN SHOPPING FOR DEVICES THAT CAN HANDLE THE GREAT OUTDOORS.

If you're looking to pack light, take note of your chargers. You're doing well if you can get multiple gadgets charged using one micro-USB cord.

Consider where you're going and when — it might not be worth waterproofing when you're in the desert. You can check what the IP rating of gear actually means by visiting en.wikipedia.org/wiki/IP_Code.

Touch screens need to be sensitive enough to gloved hands, and it's worth testing to see if you can use any physical buttons when your digits are wrapped up, too.

When backpacking, the rule of thumb is to carry no more than 30% of your body-weight, so the lighter your tech, the better.

Backpack space is precious — you might want to securely strap your gear to your bag, rather than in it.

If you go bush, or wind up stranded, you'll either need something with decent battery life or an easy way to recharge your batteries.

You're not always going to be able to Google instructions in the middle of nowhere, so get to grips with your gear before you leave town.

It's not just about the tech: search for the free apps ICE and Emergency+ on iPhone/Android — they'll both help you (and fellow travellers) in an emergency.

A ROBUST BLUETOOTH SPEAKER WITH BIG SOUND.

THE BRV-X SCREAMS sturdy, from the big, sharply-angled buttons and tie-down webbing to the IPX7 waterproof rating. It's simple and user-friendly but quite powerful, and it sounds excellent — a worthy adventurous blaster with few limitations. That webbing is a great idea, giving plenty of clearance to strap the speaker to, say, a seat or post, or anything that will allow a thin strip of fabric to weave through it. While the manual cheekily suggests buying two BRV-X units for wider, bolder stereo sound, you won't be disappointed with the quality of just one of them out of the box. This thing gets loud, and an 'outdoor' switch pushes it further with minimal distortion. The internal battery is a 5,200mAh unit that promises 12 hours of life in a best-case scenario, and there's a USB port hidden behind a removable panel for recharging your smartphone. And here's its only shortcoming. To maintain its waterproof rating, you'll have to keep the latter panel locked on. That means no recharging (which makes sense), but nor can you attach an auxiliary device to the 3.5mm socket.



BRAVEN BRV-X
\$289.95
macintoshaddict.com

CRITICAL SPECS
Bluetooth 4.0, NFC pairing, 12-hours battery life, 5,200mAh li-ion battery, 23cm x 9.2cm x 7.5cm, 680g.



**A TIDY, POWERFUL AND TOUGH PORTABLE
POWER BANK.**

THE PLOX BRAND isn't that well known — surprising, because its gear is, on the whole, built tough, easy to use and smartly designed. The Powerbox is the company's flagship rechargeable battery. There are actually two models available: one built for iPhone 5/6 and one for Android and Windows phones, with each respective model coming with an integrated Lightning cable or a micro-USB plug. Regardless of which one you need, there's also an additional USB port that can be used to charge anything you like, including a tablet or GoPro, provided you have the right cord. It's a neat and compact unit, with the whole box about twice as thick and marginally longer than an iPhone 6, and the Lightning/micro-USB cord tucks into the housing. We just wish this cord was about a centimetre longer for better flexibility. It charges from flat to full in just under 8 hours, and checking its capacity is easy — shake it, and the four LEDs on the front will give you a good indication of how much charge is left. In the field, we managed to recharge our test Sony Xperia Z1 a couple of times over, with some juice left for emergencies.



PLOX 6000 POWERBOX
\$34.95
www.ploxit.com

CRITICAL SPECS
6,000 mAh, inbuilt cable and USB port, 150g.



Kobo Aura H20

READ YOUR EBOOKS ANYWHERE — EVEN IN THE RAIN.

WE'VE FOUND THE Kobo line of e-readers consistently reliable and refined in our previous tests, and the new Aura H20 keeps the tradition going. As the name alludes, this is a waterproof model, and Kobo claims the Aura can withstand up to 30 minutes at a depth of 1m. As a bonus it's dustproof too, and the charging port firmly locks into place.

Apart from that, it's very similar to the Glo HD. The Aura's resolution is almost the same (1,430 x 1,080 versus 1,448 x 1,072), though it's slightly taller, wider, thicker and heavier with a 6.8-inch screen compared to the Glo's 6-inch. The usual e-ink lag persists — there's a noticeable pause between touching the screen and something happening, for example — but once you're aware of the delay, you'll learn to be more patient, especially when entering text for a Wi-Fi password or searching the online Kobo store.

As a tough e-reader, the Aura stacks up very well. That said, if it will be roughing it, we'd still advise putting it in a case — or at the very least, using a screen protector — purely to protect the e-ink screen from being scratched and potentially dented.

Orbitkey

KEEP YOUR KEYS IN ORDER AND STYLE.

THE ORBITKEY MIGHT look like a keyring, which it is, but it's also a fantastic tool that cuts out clutter and saves time. Isn't that what the best tech does? A stitched piece of leather wraps around a central spine, and the spine slots through the eye of your keys. The Orbitkey can accommodate up to seven 2mm-thick keys, and includes both an 8GB or 32GB USB key (in the shape of key, naturally) and bottle opener.

For a tech-fueled adventure, the Orbitkey will comfortably keep your keys in a neat formation, and as long as you have the spine tight enough the keys won't slip about — ideal for anyone who puts their phone and pointy objects in the same pocket or bag, preventing thin surfaces being punctured. Getting the keys on and off is simple enough: grab a small coin and twist off the indented cap. Put whatever you can fit on the spine, screw it back together and you're set. Smartly, the thread of the spine partly locks into place, so you don't have to worry about it undoing itself and falling to pieces.

Aspera R6

A TANK OF AN ANDROID SMARTPHONE... IN BOTH PERFORMANCE AND SIZE.

THE ASPERA R6 is the Nissan Patrol of smartphones. It isn't sexy or particularly quick and it weighs a lot, but it's as rugged as they come, and you'll be glad you have it when you're in territory that would leave everything else struggling. Its looks alone designate it as a 'tough' bit of tech, with the aggressive black and gold styling on hard plastic and rubberised edges. (To our eyes, where it might have gone a touch overboard is with the faux honeycomb rear...) The R6 is pretty heavy, too, though the rounded edges at both ends of the screen and protruding buttons help to not only cushion the frame if it takes a tumble, but also make it easy to hold. Even if you do drop it in the wet stuff, the IP68 rating means it can be dunked in water for 30 minutes. It's also completely dustproof, and has great battery life. (Our video streaming test puts it at over 8 hours of screen-on time.) The R6 will also take two SIM cards — a full size and a micro — to cover all your bases when it comes to reception and/or saving a buck or two. What's especially smart is a dedicated SOS button on the side, which will call a number of your choice, even with a PIN or lock in place. In use, the screen was bright and clear although the OS wasn't especially responsive, suffering from slight stuttering.



KOBO AURA H20
\$220
store.kobobooks.com

CRITICAL SPECS
6.8-inch e-ink touchscreen @ 1,430 x 1,080 pixels (265 dpi), 4GB internal memory, 802.11b/g/n Wi-Fi, microSD support (up to 32GB), supports EPUB/PDF/MOBI/TXT/RTF/CBZ/CBR formats, Adobe DRM support, 233g.



ORBITKEY
\$39.95
orbitkey.com

CRITICAL SPECS
Genuine cowhide leather band, aluminium 7075 stainless steel, 8g (excluding keys).



ASPERA R6
\$576
asperamobile.com

CRITICAL SPECS
Android 4.4.4, 4.5-inch LCD screen @ 1,200 x 720-pixels, octa-core 1.7GHz processor, 2GB RAM, 16GB storage, 3,300mAh battery, dual SIM support, IP68 water and dust resistance, microSD slot (up to 32GB), 228g.



Find the tech for **your world**

BEAT ONLINE BLOCKS

**COMPLETE GUIDE: GET
UNRESTRICTED ACCESS TO
ALL THE STREAMING MOVIES,
TV SHOWS & MUCH MORE!**

NETFLIX IS FINALLY here! After years of waiting, the movie and TV-streaming giant has at last arrived on Aussie shores, amazing many with the amount of on-demand content that's available to stream. The Australian version of Netflix is just the tip of the iceberg, however. Locally, we can stream some 1,400 movies and TV shows via Netflix, but the US version has closer to 8,000 on offer. The good news is that you don't have to put up with this disparity — on Netflix or other streaming services. How you go about getting access to all that extra content varies depending on the service you're using, but if you've shied away from trying to get around geo-blocks before, this month's superguide can help. Over the following pages we've covered how to get the main ones up and running. And if you're worried about legality, at present there are no Australian laws against using them... although you may be breaking the terms of service so they still require some common-sense. Read on to find out the essentials.

54

**Get started
with VPNs**

[SETUP AND USE A VPN
ON YOUR PC OR MAC]

59

Beyond Netflix

[BEST ALTERNATES AND
HOW TO ACCESS THEM]

63

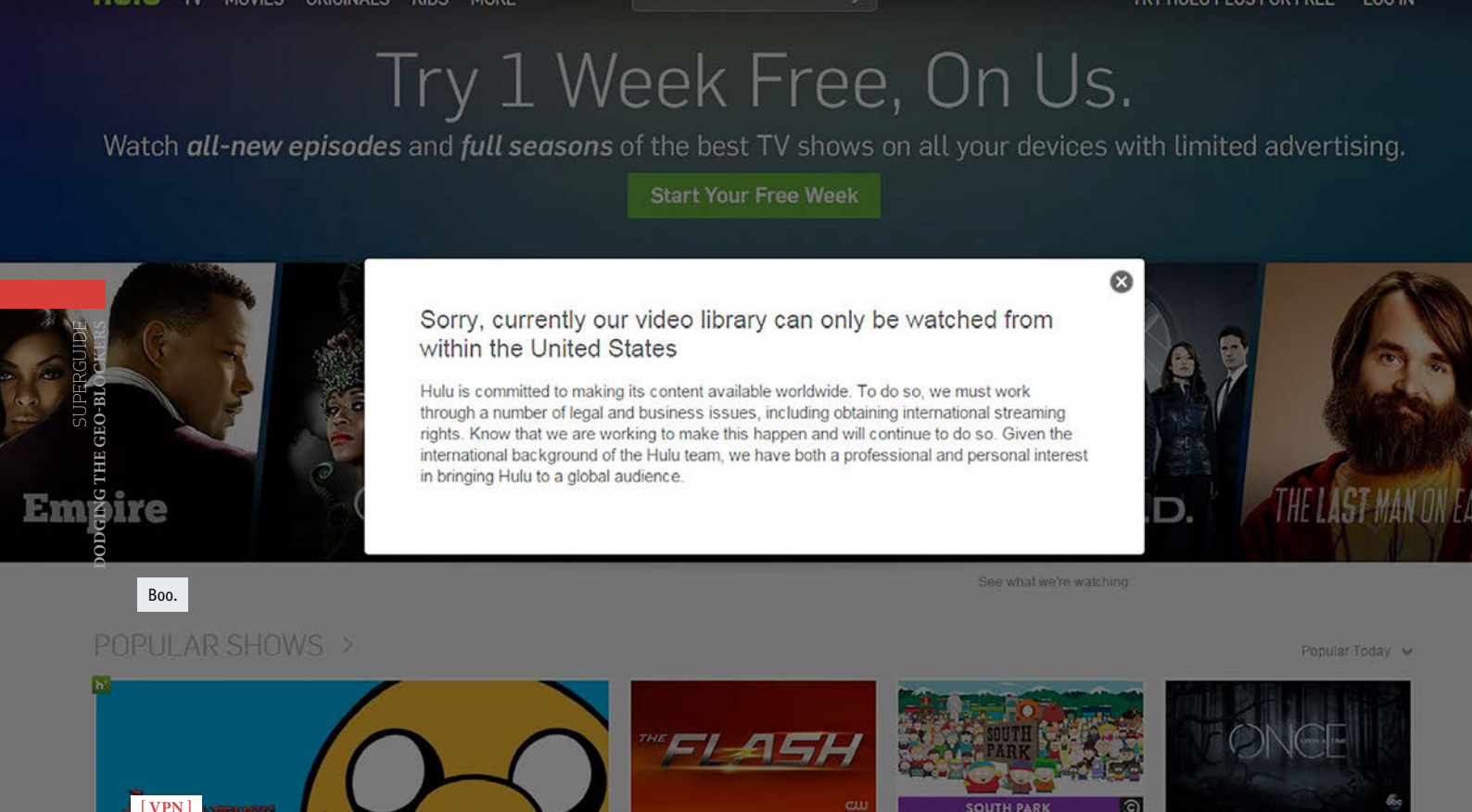
Netflix trix!

[GET MORE FROM YOUR
NETFLIX SUBSCRIPTION
WITH OUR IN-DEPTH
GUIDE]

67

**Build a
dedicated VPN
router**

[CREATE THE ULTIMATE
DEVICE FOR VPN USE]



[VPN]

Dodging the geo-blockers

UNFORTUNATELY FOR US ANTIPODEANS, WE'VE ALWAYS BEEN SOMETHING OF A BACKWATER WHEN IT COMES TO MEDIA CONTENT.

[NATHAN TAYLOR]

DOWN UNDER, WE'VE historically gotten new TV shows and movies late or not at all, and affordable video streaming services have been slow to materialise. Even with the launch of Netflix Australia and its Quickflix, Stan and Presto rivals, it's still the case that the best services are only available overseas. This is particularly true for television series — Netflix Australia has a decent suite of movies, but compared to the US Netflix its TV offering is anaemic. And there are many TV series that we can't get at all unless we subscribe to a US streaming service. And this is where geo-blocking comes in.

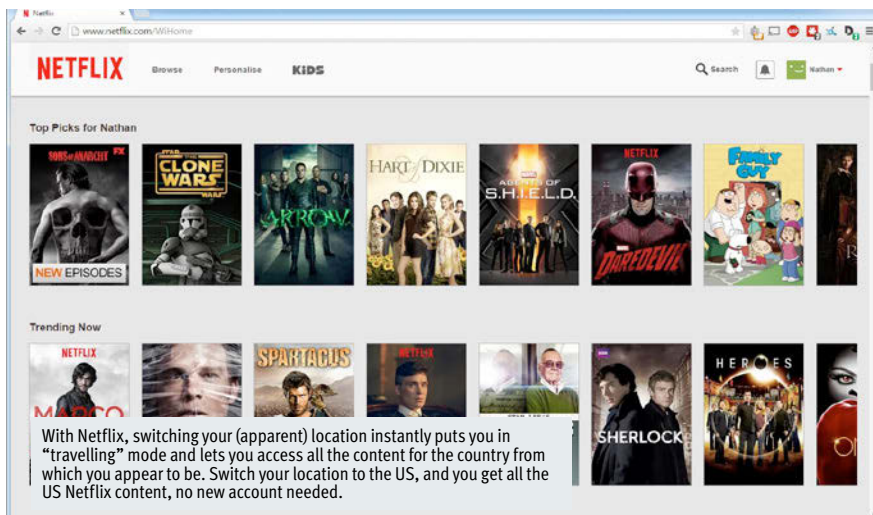
Content owners like to be able to divide the world into chunks and resell content licenses for each region, and they require their licensees to enforce that. Netflix US, Hulu, Amazon Prime and other US-based streaming services are not supposed to allow Aussies and New Zealanders to access their content. So they implement geo-blocking — if they sense that your IP address comes from a country not authorised to access content, it will be blocked.

But there are ways around this, tools that fool the streaming providers into thinking that you're from a country that's authorised. The most popular are VPNs, smart DNS services

and Hola. Each has their strengths and their weaknesses.

A VPN service is the most expensive of the three options, but it provides a level of anonymity for all your internet activity. They don't just let you access US content, they also allow you to download from BitTorrent anonymously and access other internet content without your IP address being revealed. They also provide a level of security, prevent the monitoring or your local internet connection by hackers or governments.

Smart DNS services are somewhat cheaper, and they're also easier to set up than VPN



VPN SPEEDS

Is accessing the internet over a VPN slower than accessing it directly? The short answer is yes, but by how much depends on the quality of your VPN provider. A good provider will barely impact your speeds, a bad one may cripple them. That's why it's important to read reviews and use free trials/money back periods before committing. We'd recommend paying monthly before you commit to full-year plans. If you want to compare speeds, head to **speedtest.net** and run the benchmark there. Disconnect from the VPN and run it, then connect and run it again.

PHASE 1: SIGN UP FOR A VPN SERVICE.

The first thing you need to do is sign up for a VPN service. There are dozens to choose from, and they typically charge between US\$4 and US\$10 per month. Most now offer unlimited data, but read the fine print — some have limits. You should also check how many devices can connect to it simultaneously if you plan to run a VPN on several devices at once. Signing up is pretty simple, and in the process you'll be given a username and password for that VPN provider. Make a note of it.

PHASE 2: DOWNLOAD AND INSTALL THE APP.

The VPN provider will have downloadable apps for different platforms. They'll have a Windows app for sure, and likely MacOS, Linux, Android and iOS apps as well (the latter may require that you get them from Google Play/iTunes App Store). You'll need to download and install that app — you may need administrator access since on a PC it will add a new virtual network device driver to your system.

PHASE 3: START THE APP AND SIGN IN.

Once the app is installed, all you really need to do is run it. It will open up with a login screen, where you enter the username and password supplied by your VPN provider.

PHASE 4: CHOOSE YOUR LOCATION.

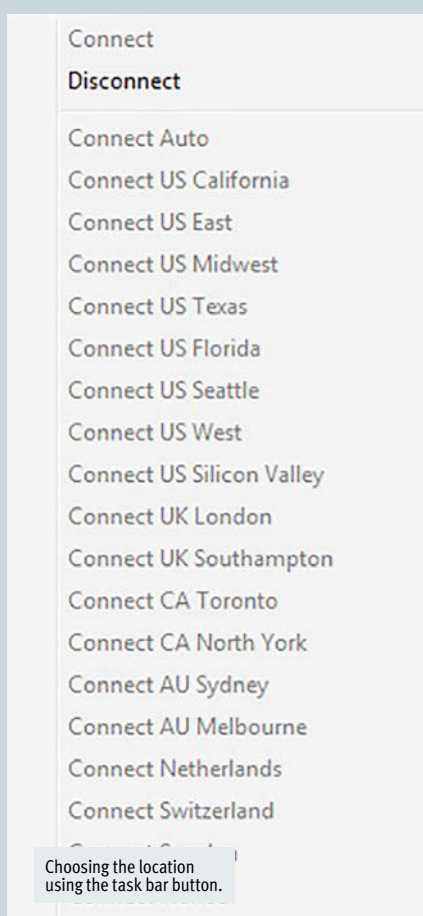
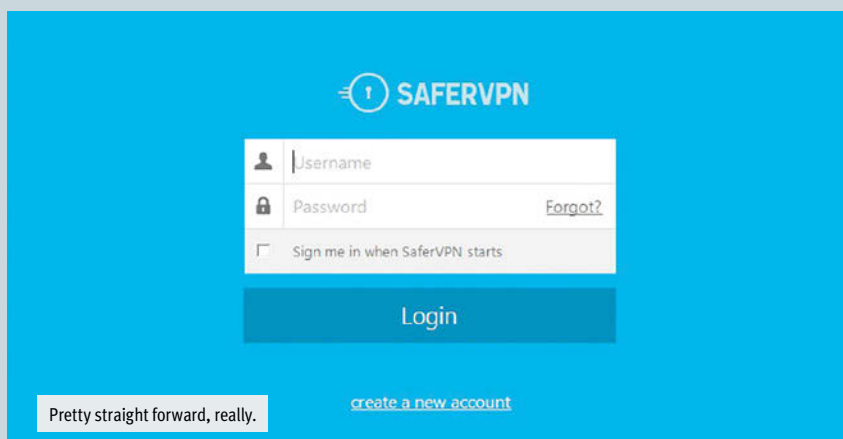
Once you're in the main interface, you have the option to choose your location. This is the location that you will appear to be from. So if you want to access a US service, you should choose a US location (west coast, preferably, since that's closer and you'll likely get better performance). The number and variety of locations will depend on your VPN provider. You can change location any time, though it will usually require disconnecting and reconnecting. You can appear to be in Britain one moment and China the next. With most VPN apps, you'll get a task bar icon, and right clicking on it will allow you to quickly connect/disconnect and choose location.

PHASE 5: CONNECT.

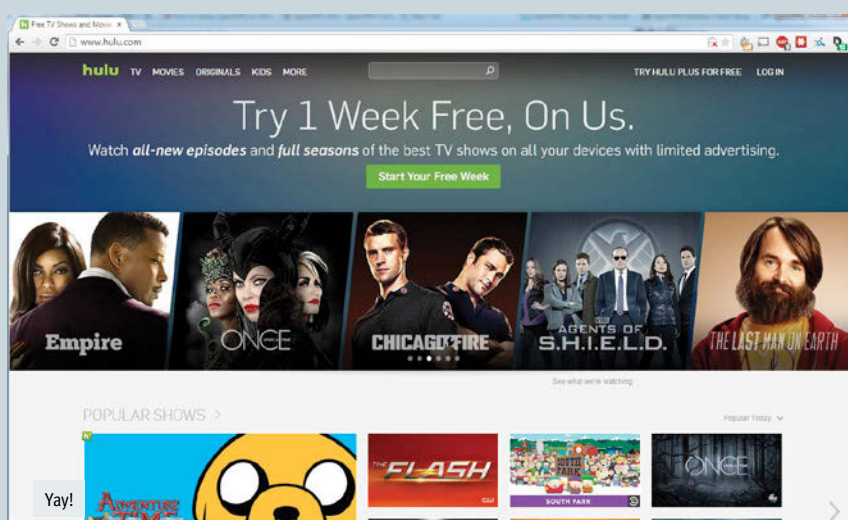
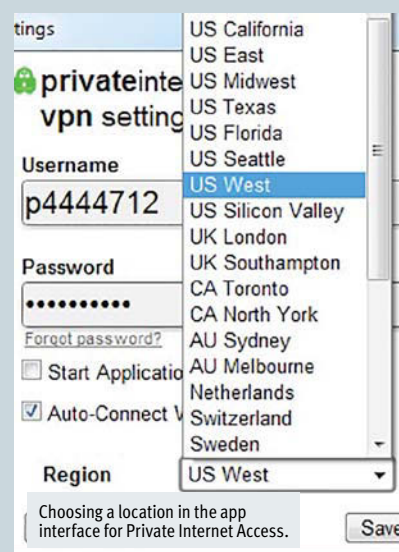
Click on Connect. The app will take a moment to authenticate, and then should connect, with your traffic routed through the selected location.

PHASE 6: OPEN THE SITE YOU'D LIKE TO ACCESS.

Now it's time to give it a whirl. Head to a service you'd like to access. **Hulu.com** (a US service) is a good place to start, since it doesn't require a sign in to use the basic service. Hopefully, you shouldn't see the "can't access from your location" popup and should have full normal access to it.



"IS ACCESSING THE INTERNET OVER A VPN SLOWER THAN ACCESSING IT DIRECTLY? THE SHORT ANSWER IS YES, BUT BY HOW MUCH DEPENDS ON THE QUALITY OF YOUR VPN PROVIDER."



services — particularly on devices like smart TV sets, game consoles and network media players. But they don't provide security nor do they hide your IP address when accessing web services like BitTorrent.

Hola is a special case, a peer to peer VPN-alike that lets you "borrow" other Hola users' connections to access overseas content. It's free, but for now it only works in web browsers (unless you're on Android).

HOW TO SET UP A VPN SERVICE

So you've decided to go all in and get a VPN service. So how does this work exactly?

VPN stands for virtual private network, and it was originally designed as a way for a computer on the internet to connect to a private local network and operate as if they were connected to that network. It was (and is) used by businesses to let roaming workers access the corporate network securely. But VPN services like Private Internet Access, SaferVPN, Hide My Ass, IP Vanish and other put it to a very different use.

They use the VPN technology to let you connect to their network through an encrypted "tunnel", and from their network access the wider internet. Because you're accessing the wider internet through them, your IP address is obscured — and a site you visit can only see the IP address of the VPN provider, and not your own. In conjunction with this, they set up VPN servers and networks in multiple countries, letting you choose which one you connect to, so that your IP address can be made to appear to be from a specific country — thus bypassing geo-blockers.

When you subscribe to and are connected to a VPN service, all your traffic travels through the VPN service. Every connection you make appears to come from the IP address of the VPN provider.

Setting up a VPN service is actually very easy these days. Every provider worth their salt provides easy connection apps for both PC and mobiles — really all you have to do is enter a username and password. Other devices, like smart TVs and set-top boxes are much harder, but it's doable. One way is to set up a special VPN router, which we'll cover a little later on.

SMART DNS SERVICES

Another popular method of bypassing geo-blocks is to use a smart DNS service like Getflix (getflix.com.au), UnoTelly (unotelly.com) and Unblock-Us (www.unblock-us.com).

A smart DNS service, technically speaking, is quite a different beast from a VPN. How it works is that you switch your regular domain name server (that's the thing that converts web

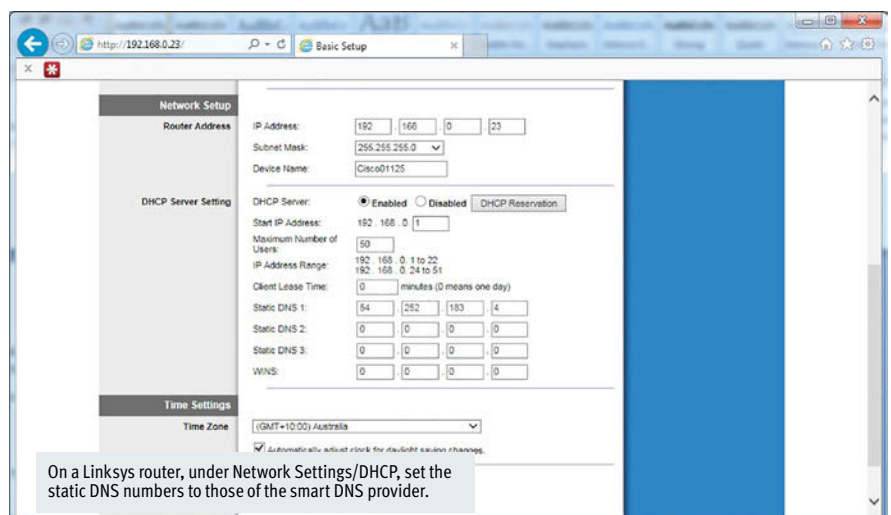
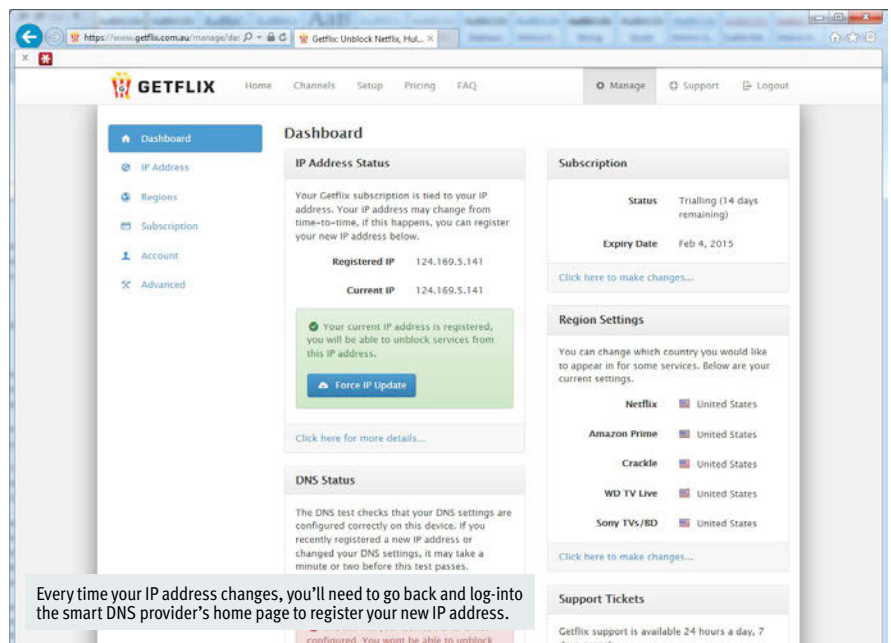
addresses like **techradar.com** into IP addresses) with one supplied by the smart DNS service provider. When you're accessing most of the internet, the smart DNS service works just like a normal one. But when you access one of a number of special media streaming sites instead of sending you to the correct IP address it sends you to a special proxy address. For example, access **techradar.com** and the Smart DNS service will work just like normal. Access **netflix.com** and instead of sending you to the correct IP address for **netflix.com**, you'll

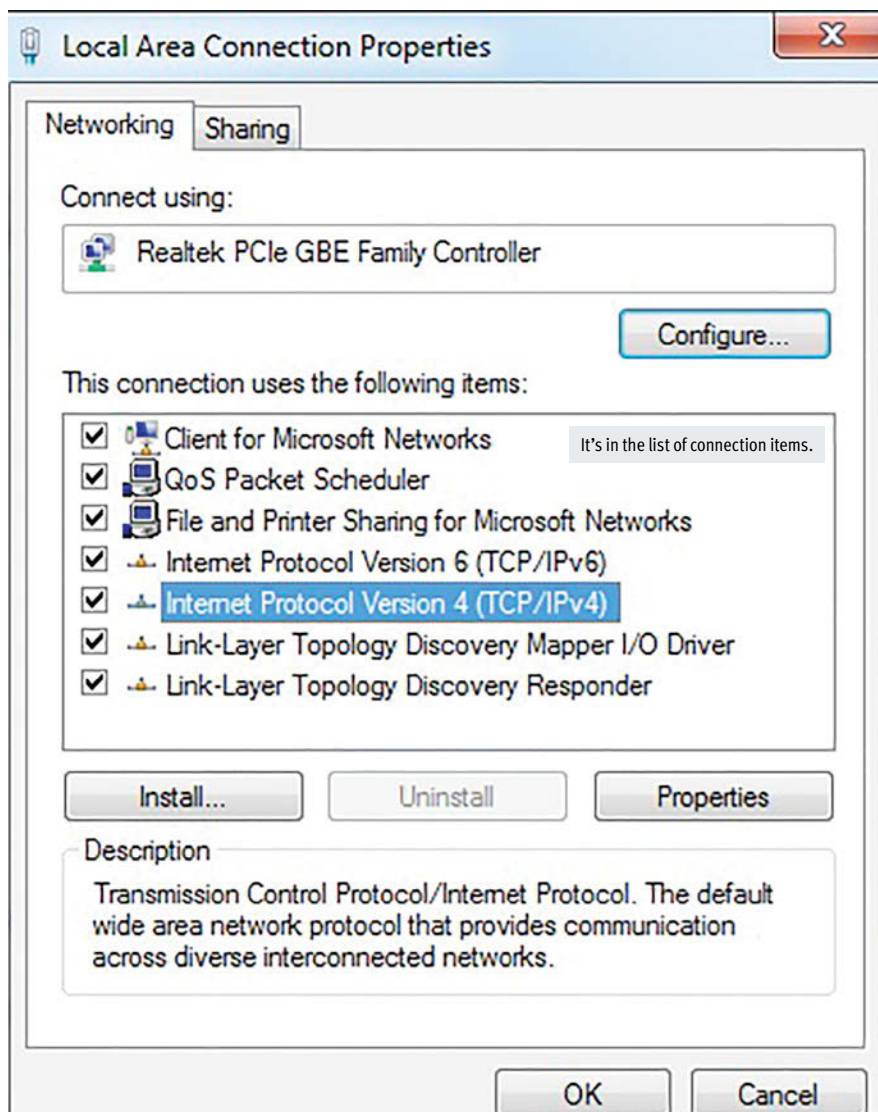
instead be redirected to a special proxy that will make you appear to be accessing it from the US.

From a user perspective, the whole thing is quite transparent. You just use the web site as normal and it should just work — all the proxy fakery goes on in the background without you ever having to worry about it.

+
"FROM A USER PERSPECTIVE,
THE WHOLE THING IS QUITE
TRANSPARENT. YOU JUST USE
THE WEB SITE AS NORMAL
AND IT SHOULD JUST
WORK — ALL THE PROXY
FAKERY GOES ON IN THE
BACKGROUND."

The big advantage of these services is that they're very easy to set up on any device using basic internet settings, and it's also quite easy to set your router up so that all your devices use it. You don't need to install any app. That means that your smart TVs and game consoles can use it just as easily as a PC.





TELSTRA CABLE GATEWAYS AND OTHER RECALCITRANTS

A handful of routers — most notably some Telstra Cable Gateways — don't let you set a DNS address. In these cases you'll have to resort to configuring individual devices.

Here's where it gets tricky. Router vendors differ about where they hide the DNS settings. You need to change the DNS number of the router to that of the smart DNS service.

- * On Linksys routers, they're found on the main 'Basic Setup' page under DHCP Server Setting (it's the Static DNS fields).
- * On an iiNet BoB, it's under 'System > DNS'.
- * On D-Link, click on 'Manual Internet Connection Setup' and change only the DNS server fields.
- * On most ASUS routers, click on WAN, head to WAN DNS settings and uncheck the automatic settings.
- * On Netgear, click on 'Basic Settings' on the left, then 'Use these DNS servers'.
- * On TP-Link, click on DHCP in the left hand panel, then on 'DHCP Settings'.

PHASE 4: CONNECT WITH YOUR DEVICES.

Most devices, if they're using automatic internet settings (AKA - DHCP), will take their lead from the router when it comes to the DNS number. They'll use the same DNS as the router — so as soon as you set the DNS number on the router, it will propagate to all your other devices connected to it. You should now be able to access the international streaming services from any device just fine. You're all set up with smart DNS.

We'll walk through setting it up on a router first. Once you've done that, any device in your home that connects to the router using automatic settings (DHCP) will also use the smart DNS service.

SETTING IT UP ON A ROUTER

PHASE 1: SIGN UP FOR A SERVICE.

The first thing you need to do is sign up for a smart DNS service. Fundamentally they all work the same, although the numbers (like the DNS service IP address) will be different.

PHASE 2: LOG INTO THE SERVICE, AND GET THE DNS SERVER DETAILS.

Heading to the provider's web site and logging in is a key part of the process. The providers use this login to register your current IP address. If your IP address changes (for example, if your router is rebooted or you go offline), you'll have to login again to re-register

your new IP address, otherwise the smart DNS service will cease to function.

You'll need to make a note of the DNS server address of your provider. GetFlix uses 54.252.183.4 primary and 54.252.183.5 secondary for Sydney. Unblock-Us uses 208.122.23.23 and 208.122.23.22. For UnoTelly you can use 54.252.112.136 (Sydney) and 168.1.67.100 (Melbourne).

The goal is to get all your devices to use this DNS number. The easiest way to do this is to set your router up to make sure all your devices use it.

PHASE 3: LOG INTO YOUR ROUTER AND CHANGE DNS SETTINGS.

In order for your router to propagate the smart DNS number, you'll need to log into it and change a few settings. You'll have to find and log into your router's admin console and then find the DNS settings.

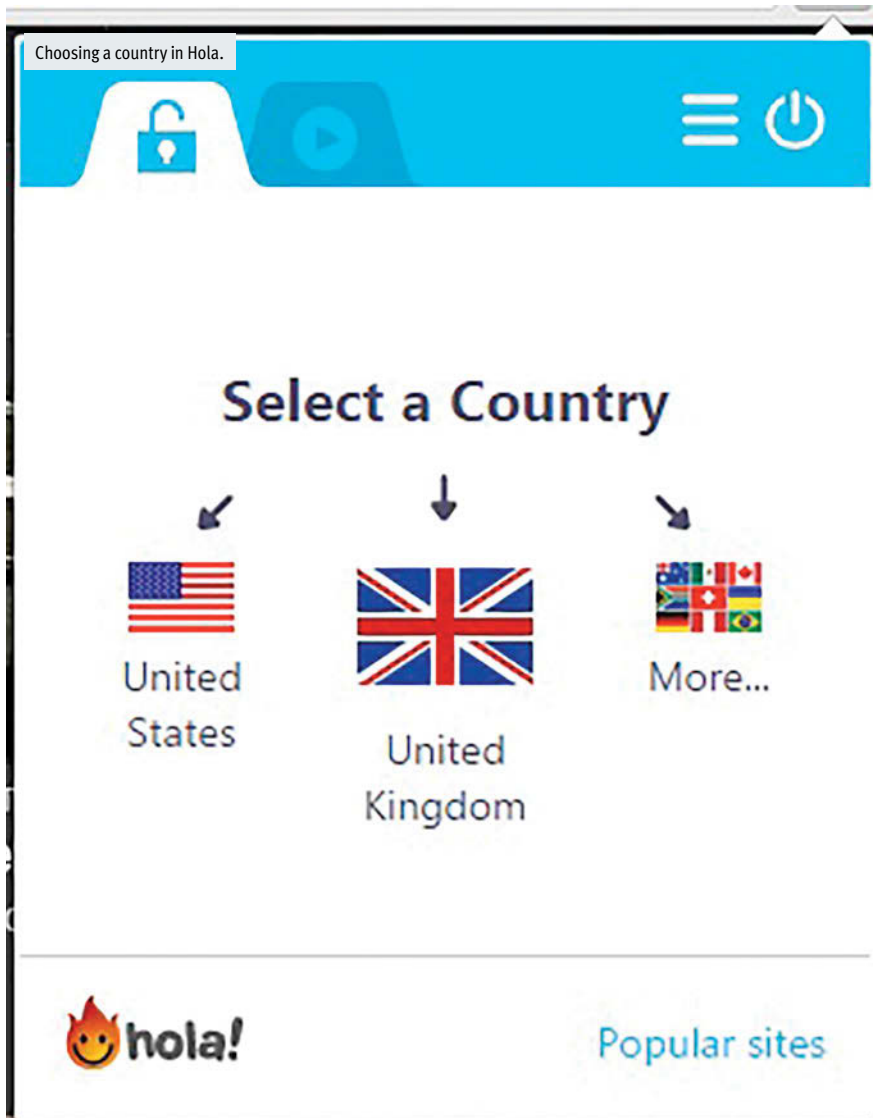
CONFIGURING INDIVIDUAL DEVICES

A once-off router configuration makes it easy for all your devices to connect, but you can also configure individual devices. You'll need to access the device's network settings and manually change the DNS number to that of the smart DNS service provider.

How you do that depends on the device. On Windows devices, go to the Control Panel and open up the Network and Sharing Center. Click on the 'Local Area Connection' link, then on Properties in the popup window. Select Internet Protocol Version 4 (TCP/IPv4) and click on Properties.

Under DNS, select the 'Use the following DNS server addresses' radio button, and enter the primary and secondary smart DNS server numbers.

On Android and iOS mobiles, you have to modify the settings for individual wireless



“EVERY DEVICE YOU WANT TO BE ABLE TO ACCESS THE SMART DNS SERVICE NEEDS TO BE CONFIGURED THIS WAY — WHICH IS WHY IT’S SO MUCH EASIER JUST TO DO THE ROUTER.”

networks, going to the advanced options and selecting a static IP. On consoles, you’ll have to go to the network settings and choose a static IP.

In the static IP settings, you have to set the gateway address as the local LAN IP address of your router (the one you use to log into the router admin) and the device’s IP address as the same as the gateway address except for the last number in the quartet, which should be

anything from 1 to 255 (but not the same as the router or any other device on the network) — for example, if your router is 192.168.1.1, then you could set the device to 192.168.1.50. The subnet mask should be 255.255.255.0. The DNS number should be the one provided by your smart DNS provider.

Every device you want to be able to access the smart DNS service needs to be configured this way — which is why it’s so much easier just to do the router.

HOLA BETTER INTERNET

Hola (hola.org) might best be described as the love child of a VPN and the anonymising network Tor. It’s essentially a peer-to-peer VPN-like service. Instead of routing through a fixed VPN site, you actually route through other Hola users, and they can theoretically route through your computer.

For example, say you want to access a

BLOCKING THE BLOCKADE BREAKERS

One of the great things about Hola is that its peer-to-peer nature prevents blocking. Hulu and HBO have recently started blocking the IP addresses of a number of VPN and smart DNS services — you’ll get a popup saying that you’re accessing the service from a VPN and that that’s not allowed. No such blocking is possible with Hola, however; there’s no fixed IP that can be blocked.

US streaming site. You ask Hola to make it appear that you’re from the US. It does this by connecting you to a Hola user that’s in the US. Then you route your data through them, appearing to the end site as if you’re from the US.

It actually works really well, although the performance can vary depending on who you’re routing through. It’s free to use as well, although there is a paid service that prevents other people from routing through you.

The biggest downside of Hola is that for the moment it’s largely browser based (except on Android). It operates as a browser add-on in Chrome and Firefox and as a downloadable app that works with IE. There’s no Hola client for things like smart TVs, network media players and consoles.

It’s very easy to use. Head to the Hola web site or grab it from the add-on/extension library in Firefox or Chrome. Installing it adds a little Hola widget to your browser.

Head to a web site with content that you normally couldn’t access because of a geo-block. Then click on the Hola icon.

A popup will appear, with a set of country options in the middle. Choose one by clicking on it (or click more if the one you want is not listed). The page will reload, and the flag icon in Hola will change. You will now appear to that site as if you’re accessing from the country selected, and should now be able to view the content. You can change it back by clicking on the flag again.

Conceivably, as long as you have Hola running, other people could route through you if there’s Australian-exclusive content they’d like to access. That could be a bandwidth concern — although very few people have a desire to access content that’s geo-blocked to Australia, so it doesn’t happen that often. If you’re worried about it, however, you can turn Hola off by clicking on the power icon. Paid users of Hola also don’t have other people routing through them. ■

Beyond Netflix: what else is worth streaming?

YOU'VE GOT YOUR ANTI-GEOBLOCKING TECHNOLOGY IN PLACE, AND YOU'RE READY TO STREAM! NOW IT'S TIME TO FIND THE THINGS THAT ARE ACTUALLY WORTH STREAMING.

[NATHAN TAYLOR]

THERE ARE PLENTY of online streaming services out there, and you can find a decent list of them at www.getflix.com.au/channels/overview. Here we've looked at some of the top ones, but we urge you to experiment. Nearly all paid subscription services have some kind of free trial period, so you've plenty of options to find the things you like.

GETTING THE US APPS

While there may be an app for a given service, it's not always a given that an Australian user can just go and download them. This is a particular problem with iOS devices and game consoles, where you only get a list of apps available for your region. If you go to the iTunes App Store or the Microsoft/PlayStation Store, you won't see a download for Hulu, for example.

To get around this on iOS, you need a US or UK (depending on the app region) iTunes account/Apple ID. You'll have to create a new one, which you can do on your PC in iTunes. On PlayStation, you'll also have to create a new account (so goodbye trophies) — Sony doesn't let you switch regions, and thanks to region-locking on the PlayStation hardware you may not be able to use certain apps at all. Xbox is the easiest: just go into the Xbox settings and change the region to the country needed. You can download the app, and even switch the region back afterward.

PAYING FOR US SERVICES

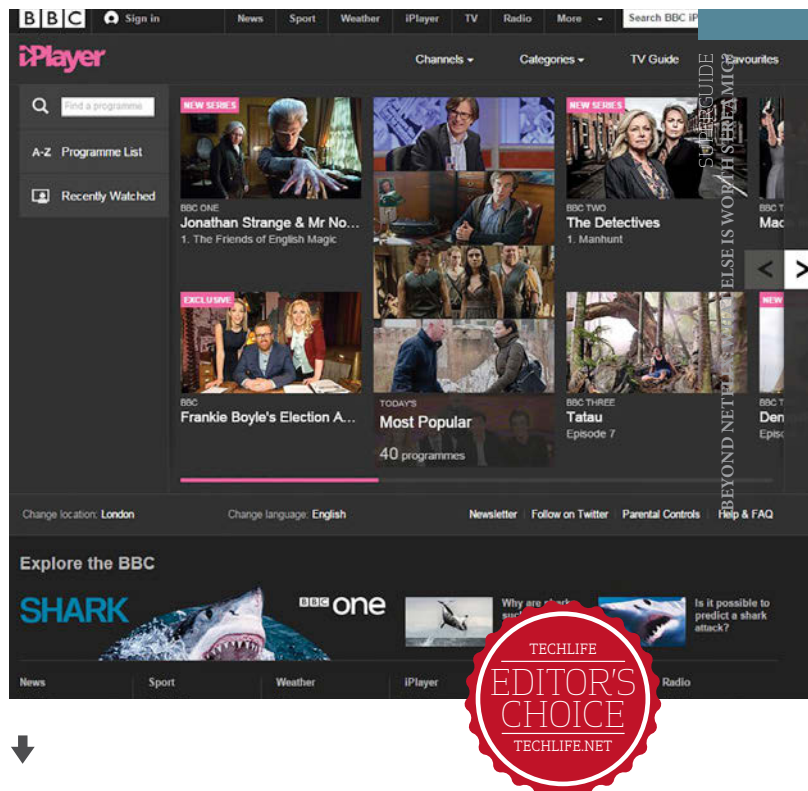
Some US streaming providers are canny to us people from down under sneaking into their services, and they don't just institute technical geo-blocks: they also prevent you from subscribing unless you have a credit card registered to a US billing address. Thankfully, this kind of restriction is becoming rarer, and there are plenty of services that will take an Australian credit card just fine, as well as accept payment through things like Pay Pal.

But what if you hit a service that doesn't like your credit card? There are a number of sidesteps you can use.

One of the most common is to use gift cards purchased from places that will accept Australian credit cards. Hulu won't accept your card? Then buy a Hulu gift card from a store that will accept either your credit card or Pay Pal.

For more general purchases, you can also get a pre-paid credit card and if you need to register the billing address you can register it in the US. A popular tool one is Entropay's Pre-Paid Virtual Visa (www.entropay.com), a pre-paid account that does not require a physical card. Instead, you create the account, load it up with as much money as you'd like, and you'll be sent a card number that you can use to make online purchases. As an aside, you can combine this with ShopMate (shopmate.auspost.com.au) for getting deliveries of physical products from the US.

Really, just like geo-blocking, credit card checks are more of an inconvenience than a brick wall. Yes, it's annoying that you have to fake your address when you're actually trying to do the right thing and pay for your content, but sometimes it's something that you just have to put up with.



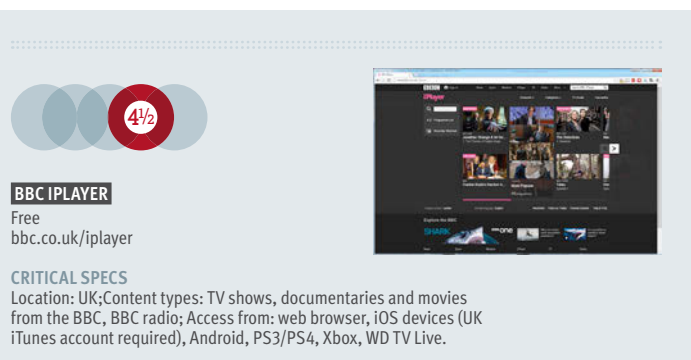
BBC iPlayer

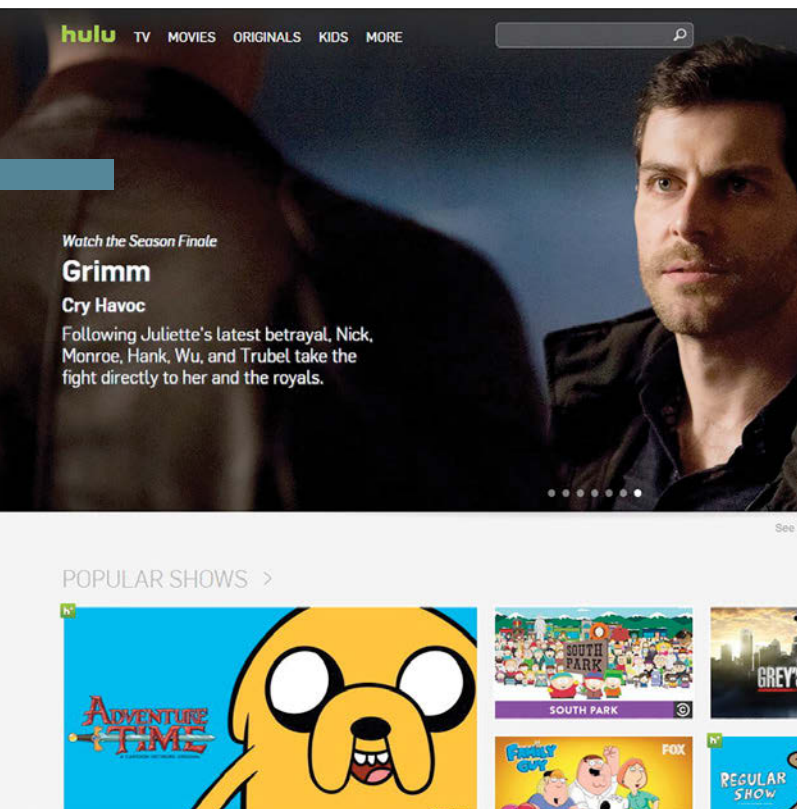
FOR A PUBLIC BROADCASTER, THE BBC DOES A PRETTY DARN GREAT JOB WITH ITS STREAMING SERVICE.

THE BBC'S IPLAYER is the UK's equivalent of ABC's iView — a way of getting access to the public broadcaster's massive library of content through a web browser or downloadable app. It's available for free to UK citizens — and of course people pretending to be UK citizens.

As with iView, content on iPlayer is timed. Most programs are available for up to 30 days after their original broadcast on the BBC, with a handful of public programs hanging around for longer and a few lasting for less.

If you've lived in the UK, you largely know what to expect from the BBC's suite of television channels. There are a variety of programs on offer: UK dramas, news and politics, documentaries, lifestyle shows, a handful of foreign-language programs and two channels devoted to children's programming. It's all quite well organised, available on SD and HD (though buffering on HD can be painful) and as an added bonus you can directly download some content to your PC for later viewing.





Hulu and Hulu Plus

A GREAT SERVICE FOR TV LOVERS — BUT IT HAS ADS. UGH.

HULU WAS ONE of the pioneers of internet streaming and it shows in the maturity of the service and the breadth of its content.

Hulu is split between the free basic service and Hulu Plus, the paid service. The free service, which doesn't even require an account, generally only lets you watch the five most recent episodes of a given TV show and even then some episodes like season enders are often excluded. Hulu Plus gives you access to all of the content, including full seasons of TV shows and movies, as well as HD streaming.

In terms of content, Hulu has an extremely strong lineup of television shows — even stronger than Netflix — and it has even started creating original content like Netflix. Its movie selection is not nearly as strong as Netflix, however.

The ugliest part of Hulu is the advertising, and subscribing to Hulu Plus does not spare you, although it does remove it from movies and kids' shows. Prepare to be hit with a disturbing amount of US ads for pharmaceutical products as you watch your TV. Hulu has also started blocking some VPN IP addresses, so you may not be able to access at all if you have a blocked VPN provider.

HULU AND HULU PLUS
Free or US\$8 per month
www.hulu.com

CRITICAL SPECS
Location: United States ;Content types: TV and Movies; Access from: web browser, iOS devices, Android, Roku, PS3/PS4, Xbox, WD TV Live.

Prime Instant Video



Amazon Prime

A STREAMING SERVICE THAT INCLUDES MUSIC AND BOOKS.

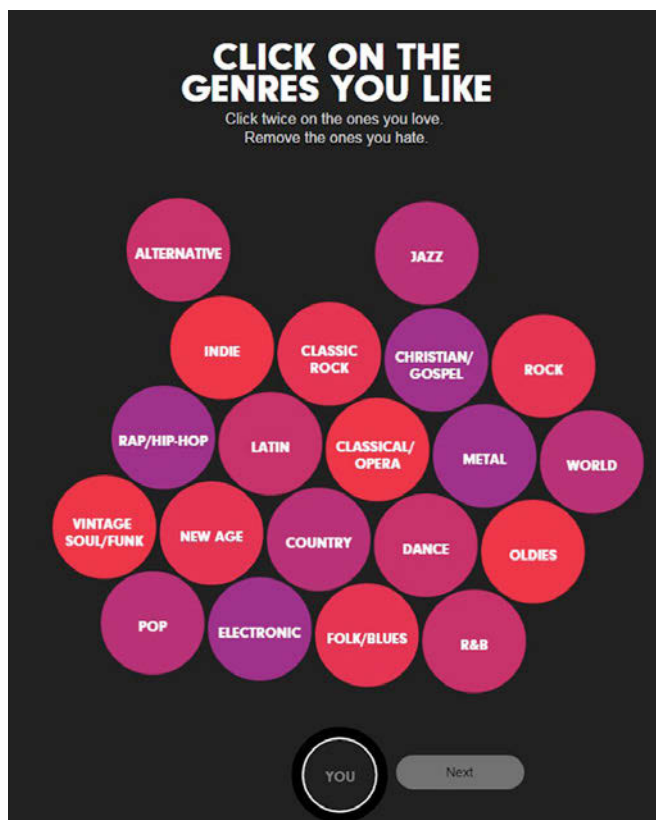
AMAZON PRIME IS an unusual service, in that it's not just about streaming content. It also covers free delivery (which isn't really relevant, since that free delivery doesn't cover Australia) and eBook "lending" which lets you temporarily download one eBook a month to your Kindle. It's the only subscription service here that actually covers books.

The Amazon Prime Instant Video lineup of movies and TV shows is a little eclectic, but there's stuff here that can't be found on Netflix, including some original content — though not nearly as much content in total as Netflix US. We also kind of love its sorting system, which puts movies and TV shows into genres and "moods".

One thing it really does have over Netflix is the music. Amazon Prime includes unlimited music streaming with programmed ad-free stations. If there's a Grooveshark-sized hole in your music listening, it's worth giving at least the free month's trial a whirl.

AMAZON PRIME
US\$99 per year
www.amazon.com/prime

CRITICAL SPECS
Location: US ;Content types: music, movies and TV shows; Access from: web browser, iOS, Android, PS3/PS4.



Beats Music

IT'S EXPENSIVE, BUT A PRETTY DARN COOL MUSIC STREAMING SERVICE.

WHEN IT COMES to music, our local offerings are not at all bad. We have access to Pandora (pandora.com) and Spotify (spotify.com) here, although the US version of Spotify Premium is currently much cheaper.

One option that we don't have access to, however, is Beats Music. It's a service defined not by its content (which isn't all that notable) but by its learning and customisation system. It tries to figure out what kind of music you like and will deliver a customised stream just for you. It can be hit and miss, of course, but I did enjoy my time with it and discovered new music, and could easily add tracks to my library as they played by clicking on a button. The stream includes no ads.

You can also select individual tracks and albums and add them to your library which will persist as long as you subscribe to the service. It's pretty great overall, but given the high cost of the service (it's more expensive than Netflix!), it had better be.



BEATS MUSIC

US\$10 per month
www.beatsmusic.com

CRITICAL SPECS

Location: US; Content types: music; Access from: web browser, iOS devices, Android.



Sling TV

A CABLE TV SERVICE, BUT OVER THE INTERNET.

FORMERLY KNOWN AS DishWorld, Sling TV is a weird entry into the world of streaming TV. It is run by a satellite and cable television provider, and it looks and works a lot like a cable service. There are both live TV channels and video on demand and an awful lot of cable-ish content, including reality TV, lifestyle programs and even live streaming sports.

Like a cable service as well, it has scaling costs based on packages. The base package costs US\$20 per month. Want HBO on top of that? Add US\$15 (in fact, this is a good way to get what is essentially HBO Now without having an iOS device). Sports? Chuck in an extra \$5. Kids TV? \$5 more. The whole shebang will set you back US\$70 per month. Of course, in the grand tradition of cable TV packages, the good content is carefully spread over the different packages, and you'll be getting a lot of junk you don't care for.

The application itself is strange, but kind of compelling in the way it blends both live content and video on demand. Start it up, and you'll instantly get live TV, just like turning a TV on. There are ads, and PVR-like pausing and rewinding of some but not all live content.



SLING TV

US\$20 per month (+US\$15 for HBO, and additional charges for extra packages)
www.slingtv.com

CRITICAL SPECS

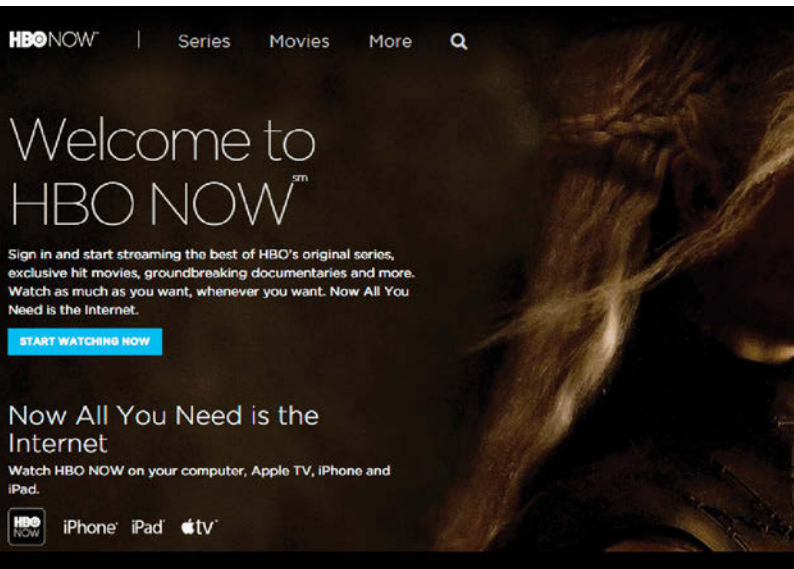
Location: US; Content types: TV shows and movies, live TV; Access from: web browser, iOS, Android, Xbox.



US CONTENT STORES

Although we've focussed on free and subscription streaming services, it's also worth noting how a US IP address also gets you access to US online content stores, which frequently have content that you can't get here. For example, the US iTunes store has a lot more content than the Australian one, including new TV shows that don't ever appear here.

One particular store of note is Vudu (www.vudu.com) that lets you buy a host of TV shows and movies for download and instant streaming. Purchases are usually per-movie or per-TV episode, but there are season passes you can buy as well as things like Disney Movies Anywhere that give you access to a host of on-demand videos.



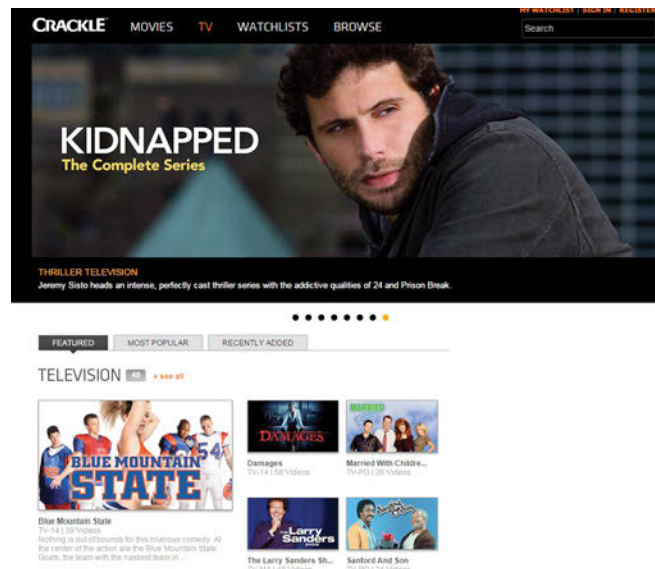
HBO Now

PLATFORM RESTRICTED AND EXPENSIVE.

THE RECENTLY LAUNCHED HBO Now was created as a place where non-cable subscribers could get access to HBO original content, including things like *Game of Thrones* as well as a selection of movies and documentaries. (HBO also has HBO Go, but that requires a subscription to a US cable TV service.)

What HBO Now does, it does well — it's beautifully designed and organised and it streams its shows smoothly and in HD — but it's pretty darn expensive for what's on offer. It also requires a US iTunes subscription to set up (yuck) and only works in a browser or on iOS devices and the Apple TV.

As an added kicker, HBO recently started blocking known VPN IP addresses from the service, so you may not be able to access it at all unless you use something like Hola, which may not deliver enough bandwidth for HD streaming. In effect, you're taking a considerable risk subscribing to the service, and so for now you'll probably be best off continuing to subscribe to Foxtel for your *Game of Thrones* fix — or checking out Sling TV.



Crackle


CRACKLE BROADCASTS OLDER STUFF AND ONLY IN SD, BUT IT'S FREE AND AVAILABLE EVERYWHERE.

CRACKLE MAY NOT have the breadth of a paid service, but for something that's free it can be pretty darn great.

You may already be familiar with Crackle — it is available in Australia — but by switching to a US location you can get access to a larger amount of content as well as different content. The content on Crackle cycles, with new shows and movies being added and old ones removed, but it's generally not bad, especially if you're not demanding the very latest movies and TV shows.

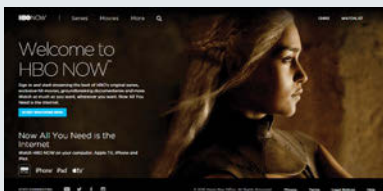
What appears on Crackle tends to be older stuff: TV shows no longer being broadcast and movies five years old or older, but you can nearly always find something worth watching, if only for a nostalgia trip. You'll probably get a lot of "I remember that movie! It was awesome!" moments when browsing Crackle. Movies and TV shows are commonly only available in SD, however.


Given that you don't even have to sign up to use it, it's most definitely worth downloading the Crackle app on your console or mobile and bookmarking it in your browser.



HBO NOW
US\$15 per month
www.hbonow.com


CRITICAL SPECS
Location: US; Content types: movies and TV shows; Access from: web browser, iOS devices (US iTunes account required).





CRACKLE
Free
www.crackle.com

CRITICAL SPECS
Location: US, UK; Content types: movies and TV; Access from: web browser, iOS devices, Android, PS3/PS4, Xbox, WD TV Live.



Popular on Netflix



Netflix trix!

GET THE MOST OUT OF YOUR NETFLIX ACCOUNT

[STEPHEN LAMBRECHTS]

NOW THAT NETFLIX has been (legitimately) available in Australia for a couple of months, you probably have a pretty good idea of how everything works. It's highly likely that you've already dived head-first into Netflix's content library like a kid in a candy store, swimming through its seemingly unlimited *Power Rangers*-obsessed Scrooge McDuck. But, did you know that there are numerous ways that you can enhance your Netflix experience? It's almost like there's a secret Netflix world just waiting for you to discover it. OK, that might be a slight exaggeration, but we guarantee that you'll find a few of these Netflix tricks and hacks to be worth your while. Some of them may even significantly improve your overall Netflix experience. So, if you're ready to rock your Netflix world, hold your remote control out in front of you and yell, "It's Netflixin' time!"

UNLOCK NETFLIX 'GOD MODE'

Netflix's signature way of displaying its content involves lining up its titles horizontally in a number of different genre categories. You then have to manually scroll through the titles in order to see each genre's suggestions.

If all that scrolling really grinds your gears, there is a solution — developer Renan Cakirer has created a Netflix God Mode browser bookmarklet (bit2pixel.com/netflix-god-mode) that removes the usual horizontal bars of content from Netflix's interface, instead laying out all of its recommendations in a much more straightforward manner.

To install the bookmarklet, visit the above URL and drag the big green 'Netflix God Mode' button onto your bookmarks bar. Now all you have to do is visit Netflix in your browser, then click on the new bookmark to automatically restructure Netflix's layout.

It should be noted that the Netflix God Mode bookmarklet will only affect Netflix when viewed in an internet browser window — it can't change the layout of Netflix on your

Show	Title	Year	Rating	Category	Available
+	Little Hope Was Arson	2013	3.3	Documentaries	06 May 2015
+	Beyond Clueless	2014	2.8	Documentaries	01 May 2015
+	Video Games: The Movie	2014	3.9	Documentaries	01 May 2015
+	Best of TEDx	2012	4	Documentaries	01 May 2015
+	Blackfish	2013	4.3	Documentaries	30 Apr 2015
+	Super Size Me	2004	3.5	Documentaries	24 Apr 2015

How long does it take to watch every episode of Agents of S.H.I.E.L.D.?

33 hours

Can your body handle so many hours of sitting?

UNBLOCK 100+ CHANNELS

Getflix's services are easy to use and also very affordable.

console, media streaming box, Apple TV or any other standalone player. With that said, you can still use the browser version to skim through the different genres on your PC, adding things to your My List for later viewing on your other players.

FIND OUT WHAT'S GENUINELY NEW ON NETFLIX

One of the things that can be frustrating about Netflix for many people is that it always wants to hide its content from you. Netflix would rather maintain the illusion of having an enormous

content library rather than giving you open access. It does this by drip-feeding new suggestions to you with the help of its recommendation algorithm.

Thankfully, there are various web sites which keep an up-to-date list of every show or film that gets added to Netflix on a daily basis, with AllFlicks (au.allflicks.net) perhaps being the most comprehensive (and user-friendly) of them all. AllFlicks provides a fantastic content list with deep search functionality, allowing you to search by name, category, type, year, 'date made available' and even by rating. Clicking on a title

“FOR SOME REASON, NETFLIX LIKES TO REARRANGE YOUR MY LIST IN ITS OWN ORDER BASED ON WHAT ITS ALGORITHM THINKS YOU’D LIKE TO WATCH.”

gives you added information on it, trailers, and even similar titles you may also like. There are also direct links to the movie or show on Netflix to watch in-browser. AllFlicks also has a ‘Randomizer’ section which will recommend a random movie to you based on select criteria.

MAKE YOUR ‘MY LIST’ YOURS AGAIN

For some reason, Netflix likes to rearrange your My List in its own order based on what its algorithm thinks you’d like to watch at any given time. This can be slightly annoying if you have a large list of queued-up titles to scroll through every time you want to watch a particular film or television show. Thankfully, Netflix has ‘Manual Ordering’ settings hidden away that allow you to order your list however you want.

In order to enable Manual Ordering, you must first login to Netflix in an internet browser window and enter your profile. Once you’re in, hover over your profile icon at the top right corner of the screen until a drop-down menu appears, then choose ‘Your Account’ from the options available. In the ‘Your Profile’ section of your account settings, click on ‘Order in My List’. Tick the ‘Manual Ordering’ box and click ‘Save’.

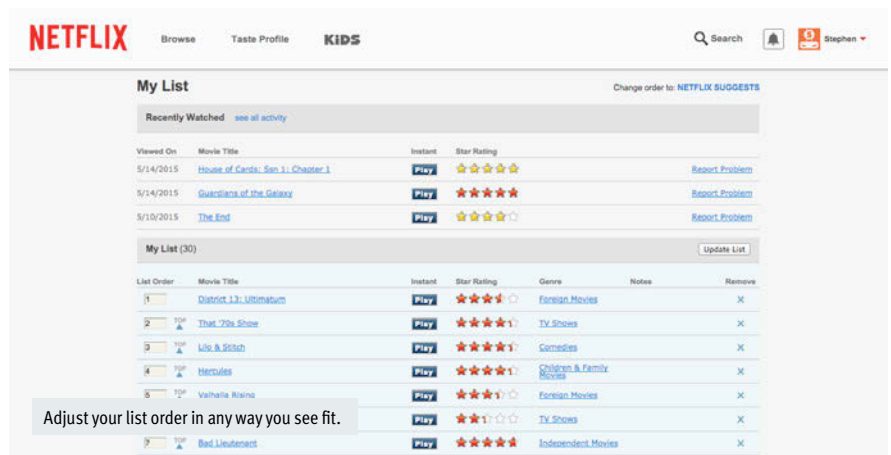
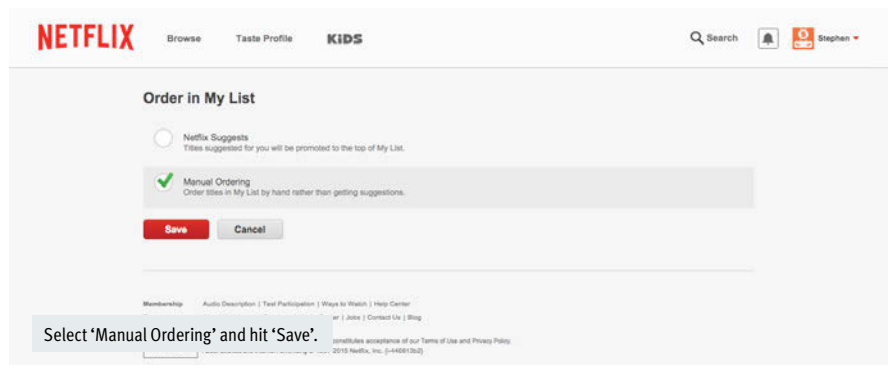
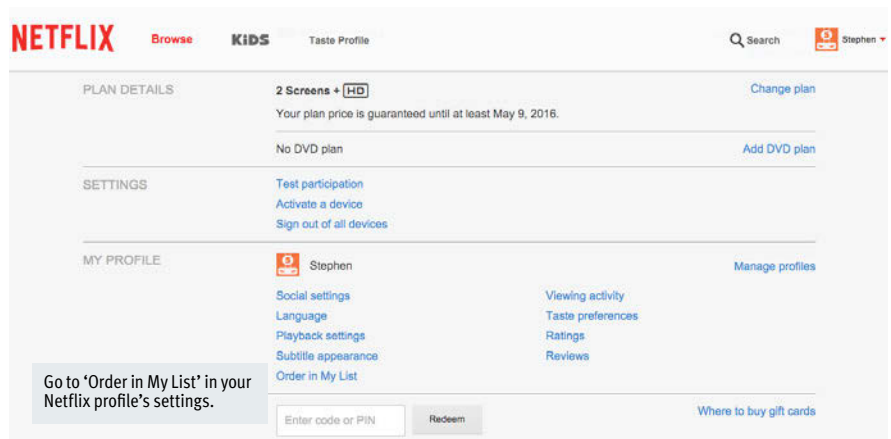
Now head to your home screen, click on ‘Browse’ and then ‘My List’, and you’ll be presented with a complete list of your queued items that can be ordered in any way you desire. You can also easily remove titles from your list here.

PERSONALISE YOUR SUGGESTIONS

Netflix likes to suggest many types of shows and movies to its users, though sometimes they’re not always the kinds you’re interested in seeing. If you’re a fan of a particular genre, whether it be horror or documentaries, you can make sure that Netflix always suggests them to you.

When visiting Netflix in a web browser, you’ll notice a ‘Personalise’ section sandwiched between ‘Browse’ and ‘Kids’ at the top of the screen. Entering this section presents you with a quiz, asking you about how often you watch certain genres — never, sometimes or often. Once you’ve filled that out, click ‘Next’.

On the next screen, you’ll be shown a range of



titles in the genres you favoured on the previous screen. To further refine Netflix’s recommendations in these genres, give each of the titles a rating out of five stars. Do this on one more screen to help Netflix get ‘smarter’ for you, and then let the algorithm work its magic. You should now (hopefully) find yourself with a better range of recommendations.

BINGE-WATCHING NETFLIX SHOWS

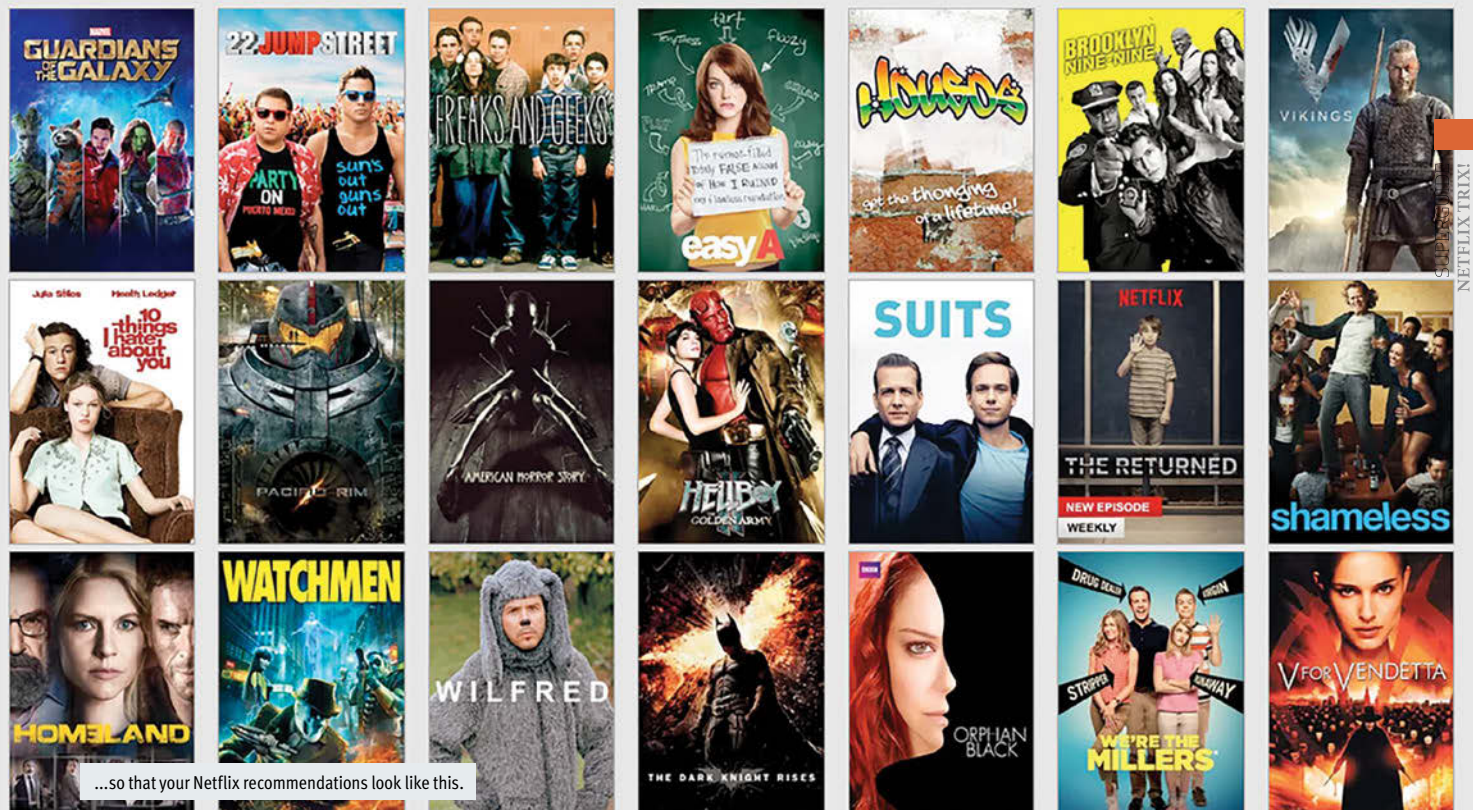
Decades of traditional television broadcasting practices have groomed us to watch our favourite shows on a week-by-week basis. And, because TV showrunners desperately want us to tune in for every episode of their shows, many programs are

built on a cliffhanger model in the hopes that we, the audience, will need to know what happens next. That weekly wait can be brutal in the age of instant gratification.

With that said, Netflix has changed the game by giving its customers instant access to entire seasons of its shows on day one — that includes the big guns like *House of Cards*, *Orange is the New Black* and Marvel’s *Daredevil*. While DVD boxsets started the binge-watching trend, Netflix perfected it.

But how much binge-watching is too much? Everyone has a limit, which is why BingeClock (www.bingeclock.com) is such a useful web site. You can type the name of any television show

Popular on Netflix



...so that your Netflix recommendations look like this.

NETFLIX AROUND THE WORLD Home Popular Highly Rated

SEARCH **NETFLIX** FOR

iron man

Available Titles

3012 1313 1600 1787 3383 3323 2997 2532 2173 1624 1659 2712 1474 3015 2089 1303 2450 2536 1718 3459

Searching all Netflix regions for iron man

Iron Man (2008)
Action, Action & Adventure, Action Sci-Fi & Fantasy
Jon Favreau
Robert Downey Jr. Terrence Howard Jeff Bridges Gwyneth Paltrow Leslie Bibb Shaun Toub Faran Tahir Clark Gregg Bill Smitrovich Sayed Badreya
After escaping kidnappers by building makeshift power armor, a weapons maker turns his creation into a force for good by using it to fight crime.

The Man in the Iron Mask (1998)
Action, Action & Adventure, Adventures
Randall Wallace
Leonardo DiCaprio Jeremy Irons John Malkovich Gérard Depardieu Gabriel Byrne Anne Parillaud Judith Godrèche Edward Atterton Peter Sarsgaard Hugh Laurie
In this star-studded swashbuckler, the fabred Musketeers hatch a scheme to replace callous King Louis XIV with his unjustly imprisoned twin brother.

Search every territory of Netflix for certain movies.

that's currently available on Netflix to get an instant answer on how long it would take to watch. So if you're thinking about watching *House of Cards* for instance, you could make that decision based on whether or not you're willing to spend 39 hours watching it.

FORCE VIDEOS TO PLAY IN HD

Netflix's adaptive bitrate is quite an impressive thing. It allows your shows and movies to continue streaming without annoying instances of buffering by automatically raising and lowering the bitrate of streamed video based on the quality of your bandwidth at any given moment. However, if your bitrate is fluctuating a little too much for your liking, there is a trick to forcing Netflix's stream to be locked in high

definition — although this trick only works while viewing Netflix on a PC or Mac through a web browser.

To enable Netflix's Stream Manager options on a Windows PC, start playing a Netflix video and then hold down the following keys: 'Ctrl-Shift-Alt-S'.

You will be presented with a menu that allows you to override the audio and video bitrates for the video you are watching, and even the content delivery network (CDN).

To do the same from a Mac OS X computer, start watching something and hold down 'Ctrl-Shift-Option-S'.

While Netflix's Super HD bitrates — generally used by content above 1080p, like 4K — are not available in a web browser, you can rest assured

NETFLIX
God Mode Bookmarklet

Drag the green button to your bookmarks bar.
and click on the bookmarklet to view all the movies

Netflix | God Mode

Follow me on [Twitter](#) @bitzpixel for cool stuff!

Get the Source Code

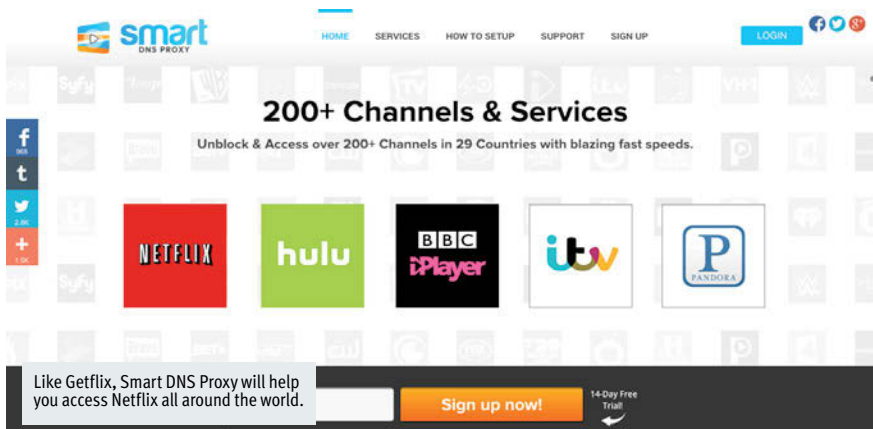
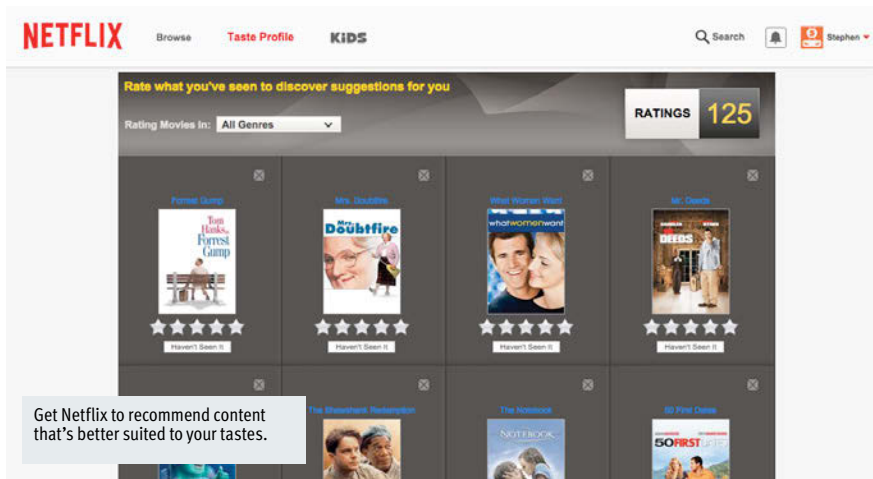
Drag the green button to your Bookmarks Bar...

that you're at least getting a locked high-definition stream at the highest bitrate the browser version will allow.

VIEW OTHER COUNTRIES NETFLIX LIBRARIES

If there's one thing about Netflix that many people aren't aware of, it's that your login details can be used to access all of the other versions of Netflix around the world — one Netflix account fits all. You don't have to change your payment details or sign up again or anything — all you have to do is trick Netflix into thinking you're in another country.

Netflix is designed to automatically show you different versions of its service depending on your computer or playback device's location. If you were to take a trip to Brazil and open the



Netflix app during your visit, Brazilian Netflix's content selection is what would appear on your screen.

Luckily, you don't have to purchase plane tickets to view Netflix content from different regions — a smart DNS or VPN service will hide your real location and put your online location anywhere you want in the world.

VPN (virtual private network) services let you send and receive all of your internet data through

encrypted tunnels to servers all over the globe.

There are a range of VPN services to choose from, all offering servers in different physical locations, so we suggest reading our 'VPNs explained' feature (see TechLife #37, page 74) to see which service best suits your needs.

If you're after a cheaper and simpler alternative to VPNs, a smart DNS service could be the answer. Getflix (www.getflix.com.au) is a geolocation-hiding service that will provide you

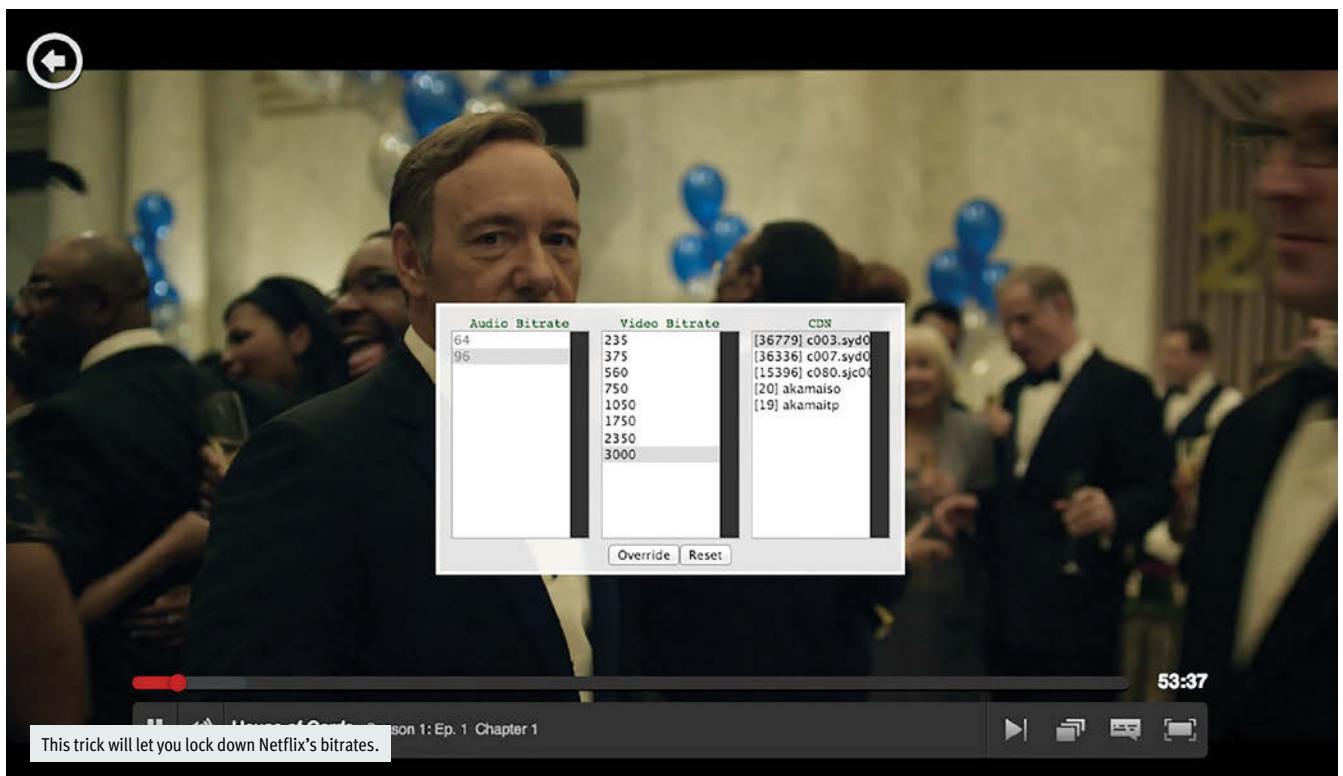
with a smart DNS address for only US\$3.95 a month. Getflix provides simple instructions on how to set your Netflix-playing devices up with your newly acquired DNS addresses. And if you do decide that you want more, Getflix has also recently added a VPN service to its subscription at no extra cost.

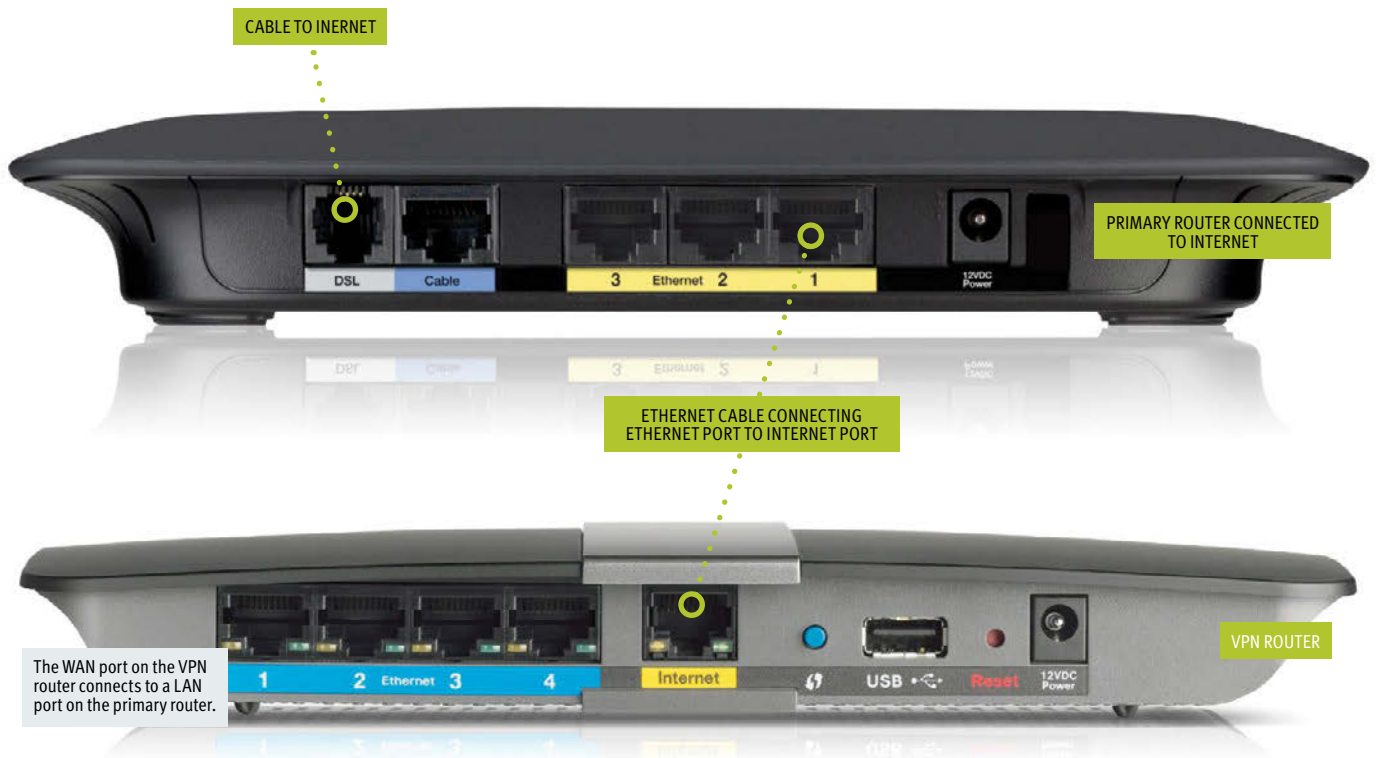
Smart DNS Proxy (www.smartdnsproxy.com) is another all-inclusive service that provides smart DNS and VPN functionality and access to a range of servers around the world for the reasonable price of US\$4.90 a month.

Of course, if you're going to go the smart DNS or VPN route in order to trick Netflix into thinking you're in a different territory, it's worth finding out what those other territories offer in terms of their content libraries.

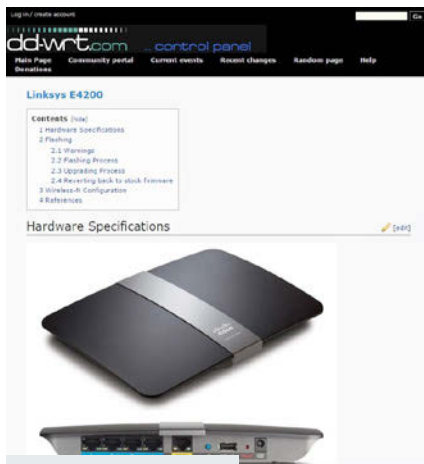
The Netflix Around the World web site (netflixaroundtheworld.com) lets you search for individual shows and movies, and quickly tells you which Netflix territories they're available in. You can also find out which shows are most popular in the world overall, and which ones have the highest user ratings.

The site also shows the number of available titles for a selection of Netflix territories along the top of the screen, though it can be a bit disheartening to see the huge disparity between each country — at the time of writing, Australian Netflix has 1,313 titles in its library, while the United States customers have 7,724 streaming titles to choose from. ■





The WAN port on the VPN router connects to a LAN port on the primary router.



The DD-WRT Wiki is essential.

PHYSICAL CONFIGURATION

Now to plug your VPN router in. Grab an Ethernet cable and connect the WAN (internet) port on the VPN router to any LAN port on the primary router.

Now connect your PC using an Ethernet cable to a LAN port on the VPN router. And we'll start flashing.

INSTALLING DD-WRT

The router page from the DD-WRT Wiki has the exact instructions on how to flash your router. If you're lucky, it essentially goes:

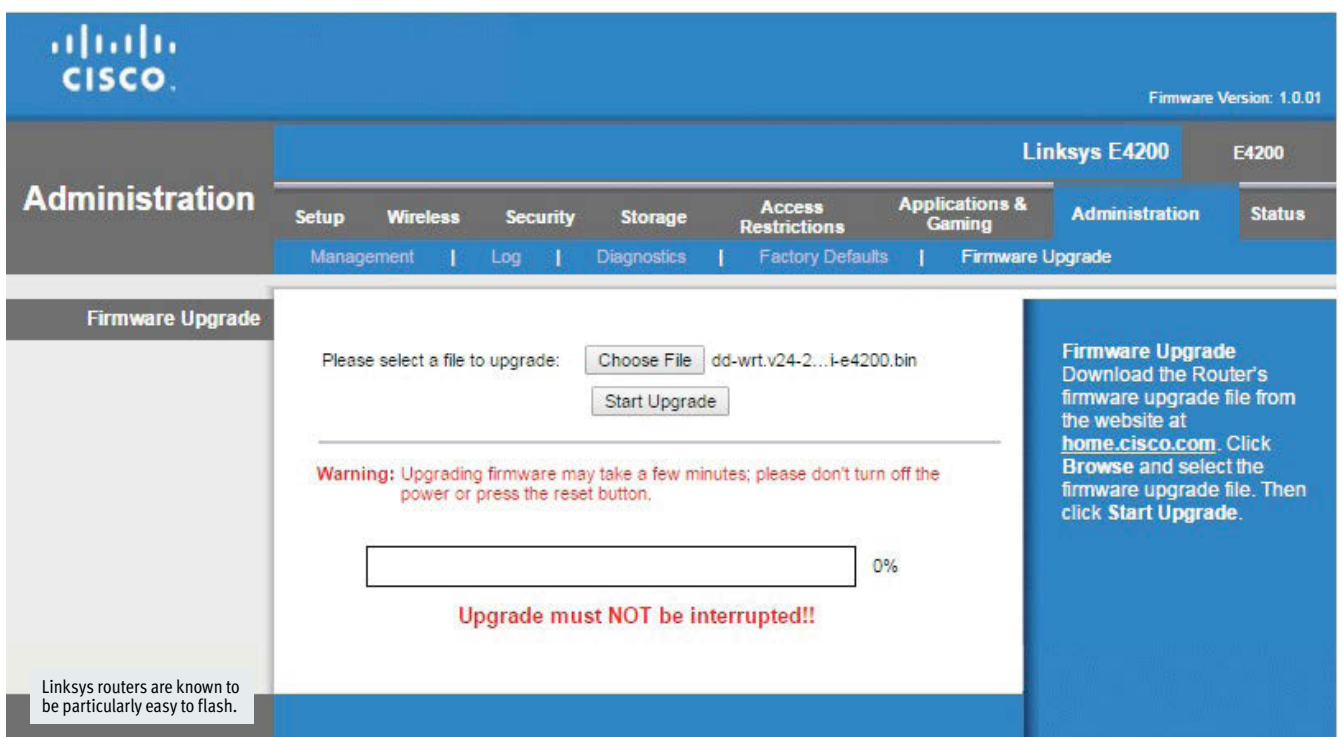
- 01 Perform a 30/30/30 hard reset on the router. This means, while the router is power on, press and hold the reset button for 30

seconds. Then, still holding the button, turn the power off and wait 30 more. Then (again, still holding the button) turn the power on and wait another 30.

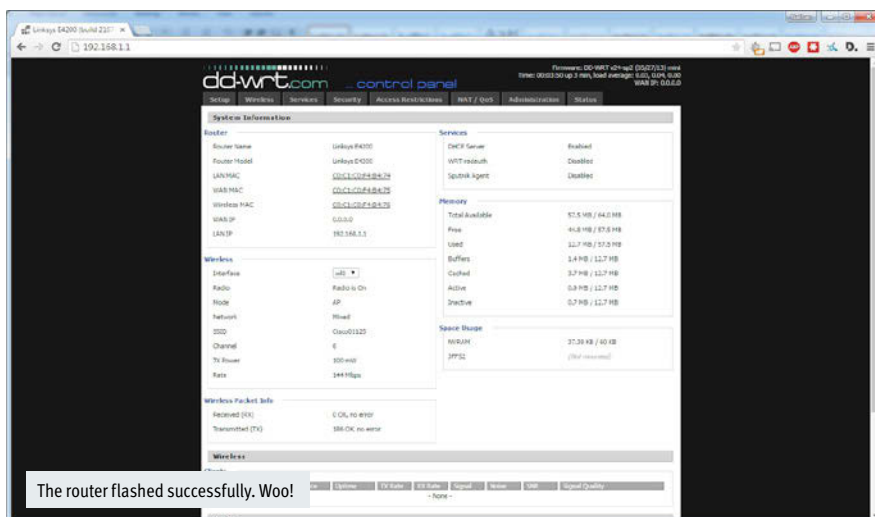
- 02 Log into the router's admin page and go to the firmware upgrade section (usually found under administration). Use the file option, and select the .bin file you downloaded from the DD-WRT Wiki. Click start.

- 03 Wait a few minutes while it updates. Then perform another hard reset.

If you're not so lucky, you may have to perform some arcane hoodoo to put the router into debug mode. Again, follow the DD-WRT Wiki instructions very carefully, or you risk ruining the router!



Linksys routers are known to be particularly easy to flash.



INITIAL SETUP

Hopefully the router flashed successfully. Now it's time for some basic setup tasks. The default IP address of DD-WRT is 192.168.1.1. Open your browser, and enter that IP address into the address bar. The default username is root, password admin. You should see the DD-WRT interface.

NOW FOR SOME BASIC SET-UP TASKS

dd-wrt.com ... control panel

Time: 00:07:11

Setup

Wireless

Services

Security

Access Restrictions

NAT / QoS

Administration

Basic Settings

Radius

Wireless Security

MAC Filter

WLO-Advanced

WLO-WDS

Wireless Physical Interface wlo [2.4 GHz]

Physical Interface wlo - SSID [Cisco01125] HWAddr [C0:C1:C0:F4:B4:76]

Wireless Mode

AP

Wireless Network Mode

Mixed

Wireless Network Name (SSID)

TechLifeVPN24

Wireless Channel

Auto

Channel Width

Auto

Wireless SSID Broadcast

☒ Enable
 ☐ Disable

Sensitivity Range (ACK Timing)

2000

(Default: 2000 meters)

Network Configuration

☐ Unbridged
 ☒ Bridged

Virtual Interfaces

Add

Wireless Physical Interface wl1 [2.4/5 GHz]

Physical Interface wl1 - SSID [Cisco01125] HWAddr [C0:C1:C0:F4:B4:77]

Wireless Mode

AP

Wireless Network Mode

Mixed

Wireless Network Name (SSID)

TechLifeVPNS

Wireless Channel

Auto

Channel Width

Auto

Wireless SSID Broadcast

☒ Enable
 ☐ Disable

Sensitivity Range (ACK Timing)

2000

(Default: 2000 meters)

Set up wireless just like you would on a normal router. Don't forget to click on the security tab (it defaults to none) to configure WPA2.

Network Setup

Router IP

Local IP Address

192

168

2

1

Subnet Mask

255

255

255

0

Gateway

0

0

0

0

Local DNS

0

0

0

0

- 01 Set up wireless. Click on the wireless tab. You'll need to set up the wireless access point with its own unique SSIDs — just like you would a regular router. Setting up wireless allows you to quickly switch between the primary and VPN router by just changing Wi-Fi networks.
- 02 Set LAN settings. We don't want the LAN address of the of the VPN router to conflict with that of the primary router, so we may need to change it. Under 'Setup > Basic setup', find the section Network Setup/Router IP. Change the IP address of the VPN router so that it doesn't conflict with the primary router.

A good way to do this is to set it so that the third of the four numbers in the IP address is different (it can be anything between 0 and 255). For example, if your primary router's IP address is 192.168.1.1, you can set the VPN router to 192.168.2.1. If the primary router is 10.1.1.5, you could set the VPN router to 10.1.2.5 and so on. Then click Save.

- 03 Set the router up as a client on your primary router. Your VPN router is plugged into a port on your primary router — which thinks it's just another device on your network. On the main Setup/Basic Setup page you can set the WAN Connection Type. The default is DHCP, which is actually fine. But if you like, you can also switch to Static IP Address, which is just like setting up a static IP address on any other device found on your network:

- * The WAN IP address is the local address of the VPN router (the first three numbers should be the same as your primary router, but the fourth should be different; for example, if your primary is 192.168.1.1, you could set the VPN router to 192.168.1.20).
- * The subnet mask is 255.255.255.0.
- * The Gateway is the IP address of your primary router (eg. 192.168.1.1).
- * The Static DNS is the DNS server addresses for your ISP.

You'll see the value of a static IP address in the final section of this article, when we talk about connecting the networks.

Whether you go static or DHCP, make a note of the WAN IP address of your VPN router. It's there at the top right of the DD-WRT interface. You may need it later.

Just to check that everything is in working order, try to access the internet while connected to the VPN router. It should work.

Set the local IP address of the VPN router to the same as your primary router, except for the third number in the quartet.

SETTING UP THE VPN

Righty, now it's time to finally set up the VPN on the VPN router.

You'll need to head to your VPN provider's home page. It will have details and guides that you'll need to set up the VPN on the router. Most will have a guide for DD-WRT setup.

Typically you can set it up using either PPTP or OpenVPN, which are similar VPN technologies. OpenVPN is a little more secure, but it's also more difficult to set up.

Setting up PPTP primarily requires a server address provided by your VPN provider, which may include a list of servers by country, and you choose the one that you wish to appear to be from. You'll also need your VPN username and password — note that for some providers, like PIA, the PPTP username/password is distinct from the general username/password.

Now head to 'Services > VPN' in DD-WRT and enable the PPTP Client. Enter the details supplied by the VPN provider in the box.

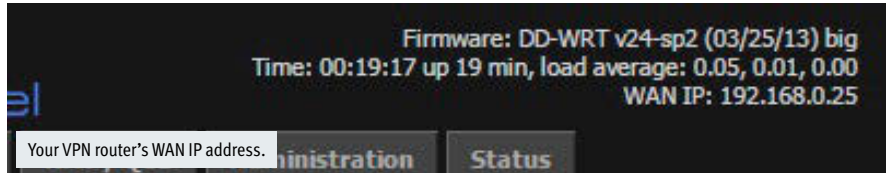
For OpenVPN, you'll usually have to copy and paste some scripts and certificates supplied by the VPN provider. Head to the provider's support page and look for the DD-WRT/OpenVPN setup guide. You'll need to follow it closely.

Once you've done that, reboot the router. When it starts up again, if the VPN client

WAN Connection Type

Connection Type	Static IP			
WAN IP Address	192	168	1	25
Subnet Mask	255	255	255	0
Gateway	192	168	1	1
Static DNS 1	0	0	0	0
Static DNS 2	0	0	0	0
Static DNS 3	0	0	0	0

Setting up a static IP address.



I SEE NO VPN SETTINGS!

If you can't see VPN settings in the DD-WRT interface, don't worry. Some of the recommended DD-WRT builds don't have it. Just head back to DD-WRT.com, and find your router in the database. It will show you alternate firmware builds with downloadable .bins for each. Look for a "big" or "OpenVPN" build and download it, then go to 'Administration > Firmware Upgrade' in DD-WRT and install it.

connected correctly, your WAN IP address should have changed. It's now your VPN IP address. Congrats! You've connected your router to the VPN.

Now that you have the VPN set up on your VPN router, you can call it a day if you like. Any device connected to the VPN router — wired or wirelessly — will automatically be connected to the VPN. Geo-blockers beware.

If you're prepared to dive into the weeds a little, however, there's more you can do. This next part is optional, but can solve a serious problem on some home networks.

GETTING THE NETWORKS TO TALK TO EACH OTHER

With this configuration one problem that you'll face is that you have what are effectively two discrete LANs. Devices connected to the primary router may not be able to talk to devices connected to the VPN router. For most devices that isn't really a problem (they still have internet access), but if you have home servers like network attached storage devices you can run into issues.

Before you do anything, first try to connect to devices attached to the other router. In theory "upstream" connections — connecting from devices attached to the VPN router to devices attached to the primary router — should just work, so servers like NAS devices should generally be connected to the primary router. (Many NASs also have multiple Ethernet ports. Here's where you can make very good use of them, connecting one port to each router, thus giving devices attached to either access to the NAS.)

It's primarily in connecting the other way, from the primary to VPN router, that you'll run into problems.

A more complete solution is to configure forwarding on both the primary and VPN routers so that data goes between them properly. This can be a little mind bending, so you need to pay close attention.

Let's start with the VPN router. We need connections from a primary router IP address

PPTP Client

PPTP Client Options

☒ Enable ☐ Disable

Server IP or DNS Name: pptp.vpnprovider.com

Remote Subnet: 192.168.1.1

Remote Subnet Mask: 192.168.1.1

MPPE Encryption: require-mppe

MTU: 1436 (Default: 1436)

MRU: 1436 (Default: 1436)

NAT: ☒ Enable ☐ Disable

Username: myvpnusername

PPTP setup is easiest.

OpenVPN Client

OpenVPN Client Options

☐ Enable ☒ Disable

Server IP/Name: (ip address or hostname)

Port: 1194

Tunnel Device: tun0

Tunnel Protocol: UDP

Encryption Cipher: Blowfish-CBC

Hash Algorithm: SHA1

Advanced Options

☐ Disable ☒ Enable

TLS Cipher: None

GPO Compression: Yes

NAT: ☐ Enable ☒ Disable

IP Address:

Subnet Mask:

Tunnel MTU setting: 1300 (Default: 1300)

Tunnel LCP Fragment: (Default: Disable)

TLS Auth Key:

Additional Config:

Policy based Routing:

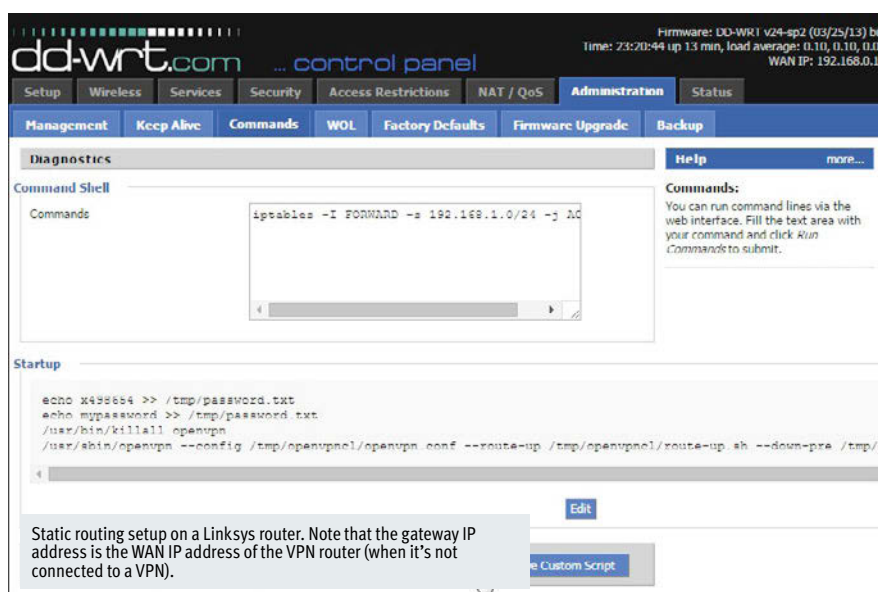
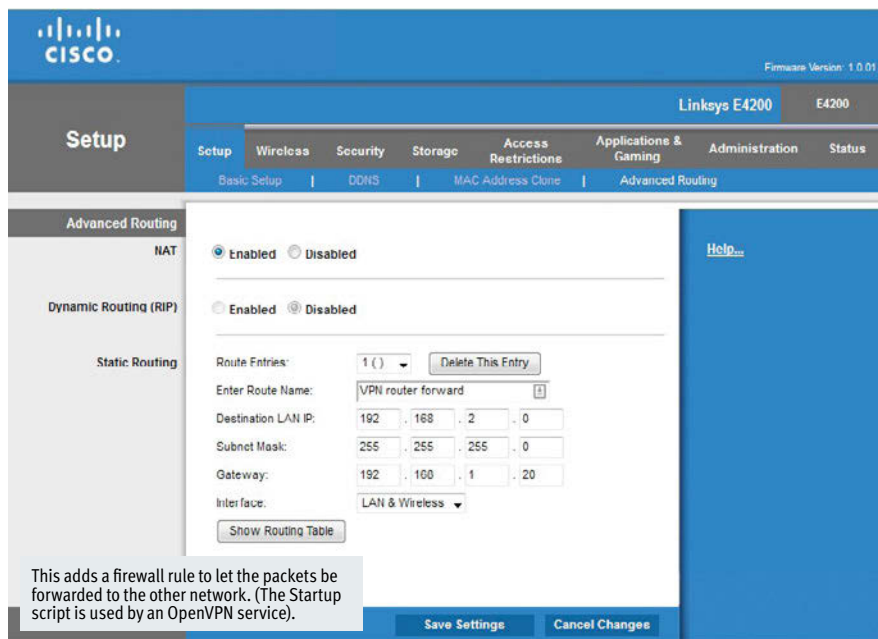
Static Key:

CA Cert:

Public Client Cert:

Private Client Key:

OpenVPN setup is more involved.



to make it through the firewall. Connect to the VPN router and enter the admin interface.

Click on Administration, then on the Commands tab. In the Command Shell box, enter this line:

```
iptables -I FORWARD -s 192.168.1.0/24 -j ACCEPT
```

Then click on the Save Firewall button. (For those who are interested, iptables is a Linux command which is for controlling firewall packet filtering rules).

This is assuming you have a 192.168.1.x address for your primary router. If it has a different address, you need to change the IP in that line so that the first three numbers are the same as your primary router — but the last number will always be 0. For example, if your primary router's LAN IP address is 192.168.5.50, the line would instead be:

```
iptables -I FORWARD -s 192.168.5.0/24 -j ACCEPT
```

One other thing you should do while

connected to the VPN router: go to 'Administration > Management' and enable the radio button for Web GUI Management. This will allow you to access the DD-WRT administration interface when you're connected to the primary router (it normally won't let you for security reasons).

Now for the other side. The idea here is to get all connections to a VPN router IP addresses to be sent to the VPN router. For example, say your VPN router's IP address is 192.168.2.1. Any device connected to it will have an IP of 192.168.2.x, so we want all attempts to connect to 192.168.2.x to be forwarded to the VPN router (which now has an open firewall for such connections). We do this using a router tool called static routes.

Connect to the primary router and log onto the admin interface. You'll have to find the Static Routes section — it's usually under Advanced Routing. You have to create a new rule that will make any data destined for LAN

addresses on your VPN router's network to be forwarded onto the VPN router. Follow these steps:

- 01 Give it a name. This is simply an identifying label for the rule. It can be anything.
- 02 Set the destination IP address as 192.168.2.0 (this assumes that your VPN router has an IP address of 192.168.2.x — as above, if it has a different address then the first three numbers are the same as you VPN router's admin console LAN IP address — but the last number will always be 0, which is a wildcard here. For example, if your VPN router's address is 192.168.10.50, then the number entered would be 192.168.10.0).
- 03 Set the subnet mask to 255.255.255.0.
- 04 Set the gateway IP address to the WAN IP address of the VPN router. Now this is tricky: remember how we asked you to make a note of the WAN IP address of the VPN router before it was connected to the VPN? We need that number. If you didn't make a note, then connect back to the VPN router and disable the VPN service. The WAN IP number should change to be the number we need. Remember that the WAN IP address of the VPN router is actually a LAN IP address of the primary router, since the VPN router is actually connected to a LAN port on the primary router. Confused? We told you this would be mind bending! As an extra note, if you set the VPN router up with DHCP, its address might change at times, so you'll need to modify this rule if it does.
- 05 Save the route.

Now that's set up, you can test it. While connected to the primary router, try to access the management console of the VPN router (this won't work unless you've enabled Web GUI on DD-WRT). Then switch around: connect to the VPN router and try to access the management console of the primary router. Hopefully it should work both ways.

Even with static routing set up, you'll still likely experience some wonkiness when you try to access devices across networks. For example, network discovery scans likely won't work across routers, so you won't be able to auto-detect media servers when using DLNA or file servers using the Network browser in Windows Explorer. To connect to them you'd have to manually Map Network Drive using the IP address of the file server. Unfortunately, unless you want to get really sophisticated and use VPN client/server technology to connect the routers or bridge the LANs with an Ethernet cable and set up a complex set of static IPs and routes (which are both possible, but beyond most users) that's just something you'll have to live with. ■



[AUGMENTED REALITY]

State of the ARt

WHY AUGMENTED REALITY TECHNOLOGY IS MORE THAN JUST VIRTUAL REALITY'S KID BROTHER.

[DANIEL GRILIOPOULOS]

IF YOU READ the tech and video games press, the buzz is all about virtual reality. Valve revealed its long-hidden VR product Vive, built with HTC, in March. Oculus Rift, meanwhile, has been bought for a cool \$2 billion by Facebook, with Facebook's owner Mark Zuckerberg calling it "the dream of science fiction" that will "unlock new worlds for us all".

Yet, quietly, people are whispering that the real story is augmented reality (AR). Influential data firms such as Juniper Research have even put figures on it. Juniper's Augmented Reality 2015-2019 report predicts revenues of \$4.1 billion for AR apps in 2019, with 1.3 billion apps in use. By contrast, Digi-Capital is advising that AR could be worth US\$120 billion by 2020, with VR valued at a mere US\$30 billion. That reflects fundamental differences in both the underlying

experience, and the progress made, in each field. We'll explore why that is, and whether virtual reality has any chance of catching up.

As part of that, we'll delve into the way big media corporations — including Microsoft, Valve, Google, Apple and Sony — are looking at this space. Each of them has its own strategy. Several have already invested billions — such as Google with Magic Leap and Microsoft with HoloLens — while others have already walked away, such as Valve, with its deliberate pivot towards VR.

That also means examining how AR tech is currently working, and where the next steps will

be. After all, low-grade AR has become commonplace in several types of mobile applications and is looking to become more widespread. Digi-Capital's prediction is based on AR capturing a substantial chunk of the

mobile phone market — and with over a billion smartphones already shipped, you could say US\$120 billion was a conservative

estimate. But then it's only talking about five years away.

It took 20 years for mobile phones to move from the Nokia Ringo, which could merely call people, to today's all-singing, all-dancing smartphones. For the full lowdown, read on.

+

"YET, QUIETLY, PEOPLE ARE WHISPERING THAT THE REAL STORY IS AUGMENTED REALITY (AR)."



Valve's Vive has a Batman-style industrial look to it. It needs two base stations to work.



HoloLens is a much smoother design, more 1950s or 1990s chromedome cyberpunk.



The final consumer Oculus Rift hasn't been seen yet, but it's aiming for ski goggle size.

The core difference between virtual reality and augmented reality technology is the worlds they move us into. One replaces, the other improves. Virtual reality creates a new world for you. It may be a world identical to the one you're in now, or it may be a world built entirely from bones and elves, but it's a world that's fundamentally separate from the world we inhabit. No perception that you see through virtual reality is what's outside of that headset. You're totally immersed. It's therefore a tech for totally-immersive experiences — escapism like movies or games.

Augmented reality, by contrast, focuses on the real world as the base, and builds on top of it. AR generates virtual items in this world by either using a mess of sensors to ensure they're correctly placed on its surfaces, or ignoring them completely and placing it on a much nearer plane. Though this sounds easier, as you don't have to generate an entire world, there are technical challenges that make versions of it as hard — but as valuable — as VR.

AR's not so good for immersion, because the real world is always there in the background. But it means it's excellent for anything involving augmenting the real world. Voice calls, advertising, mapping, social networks... or

even what Tim Merel of Digi-Capital calls "a-commerce". Yes, augmented shopping.

There are degrees of augmentation, of course. Device-led AR, where the AR is imposed on a screen that's distant from the viewer, is a mediated reality that allows developers to more simply judge the environment. At its simplest, it acts as a head-up display (HUD) that sits over the scene like a 3D movie title sits on its background. This basic tech is the level that firms such as advertising innovators Blippar or Aireal use. It simply uses your existing device and an app, and imposes a new image on an existing scene, such as putting an animation of a football player near his promotional merchandise.

At a slightly more advanced level, this tech can detect a surface or shape in the environment and use that as a marker to estimate relative depths in the scene. You'll have AR apps that use special 'fiducial marker' cards to anchor their sim, and allow the app to scale and rotate a virtual simulation to fit the environment.

The more VR-like AR requires a lot of extra tech. You need to be able to track the position of the viewer's head and their eyes, and judge relative distances, to make the illusion of

something virtual be convincing. Most of these AR devices use a head-mounted display (HMD), which is a headset supporting a display device (or two) in front of the user's eyes. The sort of HMD we're interested in also tracks head position along six degrees of freedom — that means three components of translation (up-down, forwards-backwards, left-right) and three components of rotation along those axes.

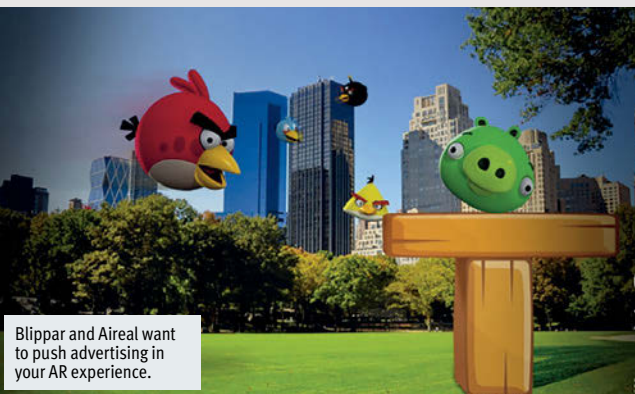
There are more extreme techs in development as well. Two different sets of contact lenses are in development, one academic, one military. The military ones are called iOptik and function much like bi-focal lenses, with the twist that they're designed to work only with AR goggles. These contact lenses will allow humans to focus both on the background scene and the HUD on the goggles at the same time. Though they're being developed for the US Department of Defence, the company behind them hopes it can sell them as consumer products soon.

The more interesting academic tech comes from the University of Washington, and is a set of 'bionic' contact lenses powered by radio waves and with LED displays built in. (The microfabrication process that means they self-assemble their circuitry using osmotic

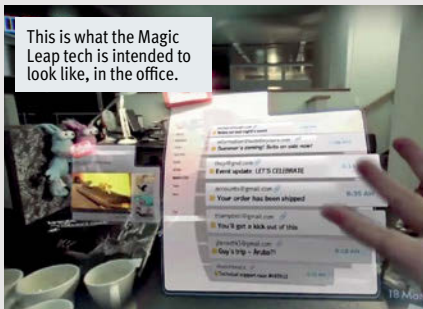
The Google-funded Magic Leap team includes superstar SF novelist Neal Stephenson.



Magic Leap works by projecting a display straight onto your retina.



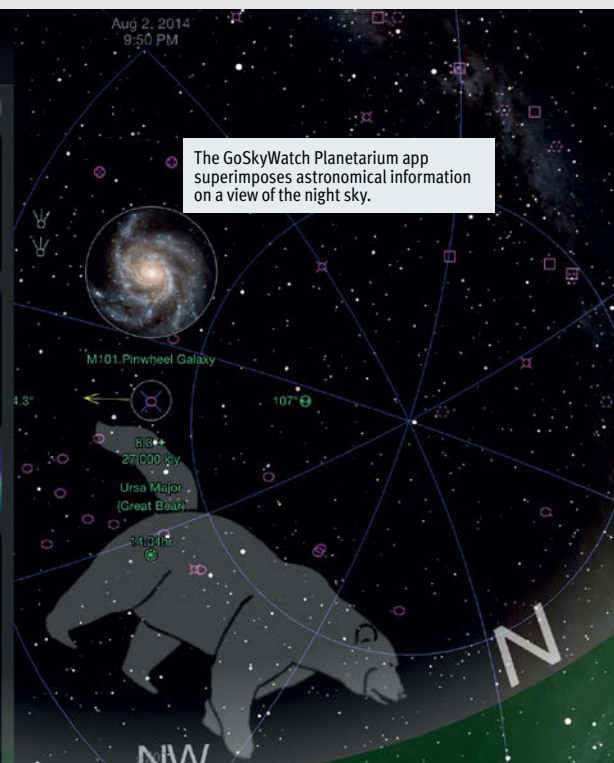
Blippar and Aireal want to push advertising in your AR experience.



This is what the Magic Leap tech is intended to look like, in the office.



A Magic Leap priority is being safe for kids.



The GoSkyWatch Planetary app superimposes astronomical information on a view of the night sky.



Microsoft has bought *Minecraft* and intends to use it on its HoloLens platform.

pressure is fascinating and totally irrelevant). At the moment, the lenses have only been tested on rabbits, so it's still at an early stage and there are questions about the quality of the images it produces. Still, it's an impressive idea.

Of course, this is all minor stuff, mostly built in the hope that the big tech firms will buy out the company behind it. What's of greatest interest now is what those firms are focusing on, and what they think they can do with it.

VALVE'S BLOWN OUT

What's most interesting about Valve's AR offering is that it's no longer Valve's AR offering.

After a Night of the Long Nerds in 2013, Valve released 25 people, including its entire AR team, to focus, we presume, on VR. The two AR project leads were given Valve's permission to do whatever they liked with the tech that they'd made, which they've called CastAR. They've created a company called Technical Illusions to finish it off.

CastAR is a bit different from other AR. It consists of a pair of polarised glasses with built-in projectors and cameras, and a separate retro-reflective surface studded with infrared LEDs. The camera uses the LEDs to track your head movement, so it can adjust the images that

the projectors cast onto the surface. This means each polarised lens gets a different, but coherent, image. Low latency lets you do things like look around an object. In other words, it projects a self-contained virtual reality into the real world.

As a result, it's used for static purposes rather than something more mobile, like the existing Samsung Gear VR and Nintendo 3DS. CastAR's pitch video focuses on uses including previewing 3D architectural blueprints, playing 3D board games remotely on unexpected surfaces, creating 3D presentations, and just for use as a 3D desktop PC. As long as you put that retroreflective material all over your house.



CastAR's prototype is the ugliest, but also the lightest-looking of the devices.



It's striking how many of these headsets hark back to kid's toys like the View-Master.



Sony's SmartEyeGlass is basically Google Glass, at half the price and with slightly worse software.

MICROSOFT DOES EVERYTHING

You've almost certainly heard of Microsoft's contribution to the AR party — its HoloLens system for Windows 10 and possibly Xbox One. It seems revolutionary, but its use of the word 'holographic' might be suspect (and mainly due to affection for Star Trek's Holodeck). Kinect seemed revolutionary in the hermetic demonstration settings you get at big tech trade shows.

HoloLens definitely looks impressive from the screenshots scattered around these pages. It's a futuristic headset that superimposes 3D creations into the world and allows you to interact with them. The impressive element here is how high quality the images they produce are — from the videos and reports, it's utterly compelling, if nowhere near as immersive as the HTC Vive or the Oculus Rift.

The actual headset is a lot bulkier than a comparative AR headset, Google Glass say, but then this has the power of a true VR headset because it's not doing a simple 2D overlay. It reportedly weighs around 400g, is adjustable to all head sizes and is totally wireless. It consists of holographic lenses, depth cameras and three separate processing units — one central, one graphics and one holographic.

The depth cameras are built from the same tech as Kinect but are lower power, have a wider viewing angle and are placed around the front and sides of the headset. They track both the user's head and hands, as HoloLens is controlled entirely by gesture and voice, *Minority Report*-style. This lets you interact with the 3D virtual models of the apps, from building blocks in *Minecraft*, to sculpting the bodywork of a motorbike. MS is working on 'pinning', which will let you stick these models in place in the environment, so you can move around them, and 'holding', so you can pick them up and manipulate them.

The apps are really what wowed the press when HoloLens was announced. Microsoft recently bought *Minecraft* for US\$2.5 billion, and it's already made a version of it that runs on HoloLens. Similarly, NASA has an app that lets you explore Mars, and there's a version of Skype that runs on it so that a builder can explain to you why you should have spent more time in carpentry classes at school.

Though the reports are mostly positive, the tech was in an early stage, and there were concerns over whether the hardware could fit into a consumer unit, and the regularity with which the illusion was broken.

That's not all, however, as Microsoft also has several other AR and VR projects underway. It definitely has an AR headset ready to go — Microsoft bought the smart glasses firm

Osterhout Design Group in March 2014. And another project called RoomAlive was shown off in October 2014, consisting of a set of projectors that transformed the walls of an entire room into a interactive environment.

Digressing for a moment, there are also persistent rumours about a VR headset for Microsoft's Xbox One games console. After all, the *Wall Street Journal* said in March 2014 that the firm already had 3D virtual reality tech ready to go. HoloLens has reduced the chances of that coming to market, but we assume Microsoft has it ready as a back-up.

GOOGLE DOES IT BETTER

Google Glass was Google's high-profile effort in the field of AR, and you might argue it was its first high-profile failure, given that Glass has currently been removed from sale ahead of a redesign and a new model. The device is a set of (quite pretentious-looking) plastic and metal glasses, with an HUD projected onto it and a smartphone-like processor behind it all, which was on sale for US\$1,500.

Glass did everything you thought it should, like understand natural voice commands, record video, take photos, and all the update elements of your phone. It had a small touchpad on the side of the device, which let you browse a timeline of recent events. The screen was a Liquid Crystal on Silicon device with an LED-illuminated display that used polarisation and reflectors to bounce the image into your eye. It had a wide range of supported Google apps, including Now, Gmail, Maps and Google+. But it's now on a hiatus while a new version is being designed.

That's not all of Google's AR efforts though. It's also making simple AR games for its Android phones, such as Ingress — a massively-multiplayer location-based game built on Google Maps. And it has Project Tango in the wings. This is a standard tech for mobile devices that allows them to navigate the physical world in the same way we inefficient meat-bags do. It uses advanced computer vision, image processing and special image sensors to make an end-to-end navigation tech that understands its own 3D motion in the world, can perceive depth, and use visual cues about areas or objects they know to constantly self-correct. At the moment, it's only available to core developers, but we assume it'll be integrated into next-gen Android hardware.

Magic Leap (www.magicleap.com) is yet another Google-funded project, coming in at US\$542 million, and a direct challenge to Microsoft's HoloLens. This is being built by a team of tech and games industry veterans, including the author Neal Stephenson and the



Microsoft's Kinect was disappointingly under-used.

TRY AR TODAY

There are many older ways to try augmented reality today. As it's a more mature technology, there are some basic devices that take advantage of it already, as well as many mobile phone applications to try. The Carl Zeiss VR One headset, for example, supports AR features and will work with any iOS or Android headset between 4.7 and 5.2 inches. Google Glass has now been cancelled, but that's out there too.

There's a huge array of AR apps for mobile phones. One of our favourites is GoSkyWatch Planetarium for iPhone and iPad. This is one of many stargazing apps that use the device's accelerometer and GPS to orient your device, so wherever you're pointing, it shows constellations, stars and nebulae. See also Anatomy 4D, Google Goggles (which can translate text on the fly), Field Trip (which lets you know about nearby attractions), and iOnRoad Augmented Driving, which gives speeding alerts, crash warnings and driving analytics to drivers.

The Playstation Vita has AR features, and comes with a package of free AR games, such as *Table Ice Hockey* and *Pulzar*. Similarly, the Nintendo 3DS comes ready-loaded with AR Games and six AR cards. Every game is super-imposed on the real world, but has no interaction with it — it's more of a gimmick.

If you've got a PS3, you could pick up a copy of *Wonderbook*. It was a Harry Potter-inspired AR tome with blank pages that only filled when viewed on your TV through the Playstation Eye camera. Similarly, the PS4 has *Playroom*, a much smoother AR sandbox where you can play with small robots that are running around your lounge. Kids love it.

You can also try the Kinect system, on both Xbox 360 and Xbox One. Though it never got the backing it deserved from developers, it has a uniquely detailed depth camera that means it can track your entire body shape — or several in the Xbox One's case — on-screen. It's probably the most advanced consumer AR tech available on the market today.

WHAT ABOUT VR?

We've covered VR extensively in the past, but it's worth giving you a quick status update as to where the tech is today. There are three projects that are nearing release. Sony's Project Morpheus, Valve and HTC's Vive, and Facebook's Oculus Rift.

Of these, Oculus Rift is the oldest, and several developer iterations have been released. A cut-down version of it made to work with Samsung mobile phones, the Samsung Gear VR, has already been released. It works by slotting a Samsung Note 4 or Galaxy S6 into a viewing device and runs with 1,280 x 1,440 on each eye and a 96 degree viewing angle.

Despite that, there's still no sign of the Oculus Rift consumer model. The most up-to-date version, the Crescent Bay prototype, has a positional tracking camera for your head, low-persistence OLED display (to eliminate blur) and runs two screens at 960 x 1,080 on each eye, at 90Hz, and a 110-degree viewing angle. No official release date has been announced, but 'early 2016' is the current target.

Sony's Project Morpheus is the quickest-developed of the three. Like its AR solution, Sony seems more concerned with getting a working version of its tech to consumers than with making it the cutting edge. The version we tried in July last year was much lower resolution and fidelity than the Oculus Rift versions we'd tried up to that point, but both companies have since substantially improved their hardware. It has a similar OLED screen running at 960 x 1,080 on each eye, a 100-degree viewing angle, and a 120Hz refresh rate. It was very comfortable, presumably because much of the hardware was sitting in a set-top box, not on our heads. It tracked our heads using the Playstation camera, and it had true 3D audio. It's due out in early 2016 for PS4, which already has motion sensitive controllers.

Valve and HTC's Vive headset is the most impressive. It recognises that some of the joy of VR is in interacting with those virtual worlds, so it does two things. First, it has a pair of bespoke controllers for you to hold, allowing limited interaction. Second, it has a set of cameras that sit in the corner of your room, detect your location and any obstacles, and track your movement, as well as setting the virtual world's limit at your real world limit.

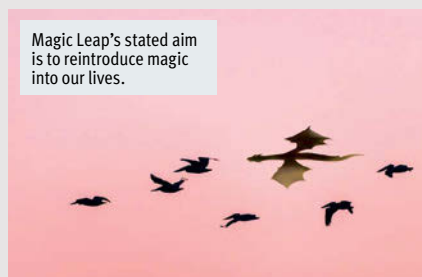
Vive has two 1,080 x 1,200 screens running at 90Hz. As the screens are narrower, you'll have a wider vertical field, and it should be lighter as your PC will do all the processing. Its big selling point is those two motion-tracking cameras, which are infrared and wireless, to follow the headset's 37 sensors. This enables you to roam freely in the virtual world. It works with multiple players and should be out this year. If you want to try VR today, you can get a casing for your mobile phone like the Google Cardboard, or a cheap third-party headset like the Immerse from Firebox.



HoloLens is intended more for business functions than entertainment.



Sony's SmartEyeGlass has a low battery life and a cheap look.



Magic Leap's stated aim is to reintroduce magic into our lives.



With \$500 million in funding, Magic Leap can make any number of virtual seahorses.

3D team at WETA (who made the *Lord of the Rings* special effects). Reports have it as more believable and solid than Microsoft's HoloLens. It works using a virtual retinal display — that is, a display projected straight onto the retina itself.

Similar to HoloLens, the simulation looked utterly convincing. The animated 3D creatures it portrayed looked detailed and sharp, and sat well in the surrounding world. And similar to HoloLens again, it ran on a huge piece of hardware (essentially a PC) sitting nearby, rather than in the headset itself. It's worth looking at the promo video to see what it's capable of. Magic Leap hasn't really been announced or promoted yet, but we're expecting it to launch in 2016 or 2017.

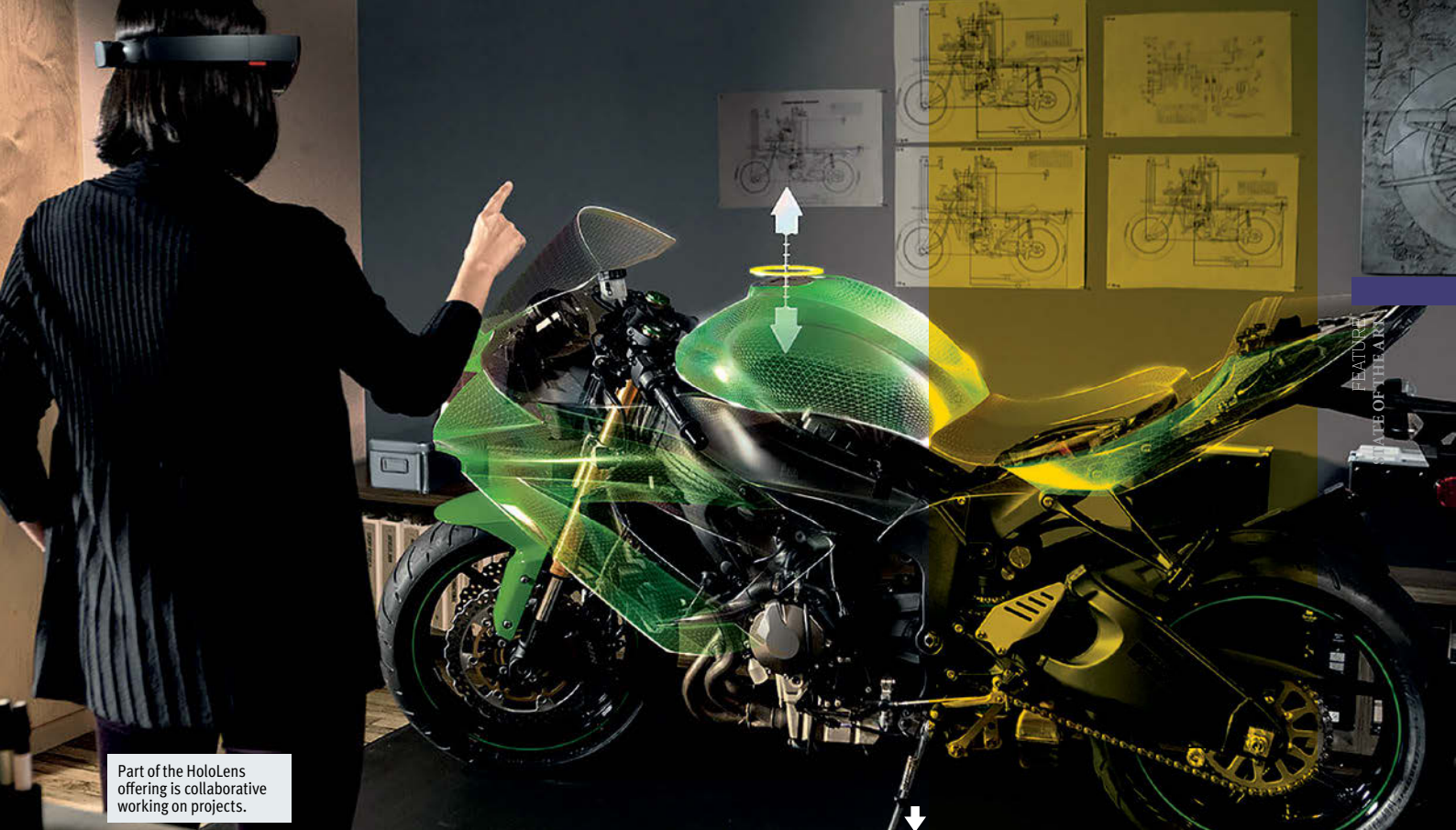
SONY'S 'ME TOO' TENDENCY

The Japanese giant always seems to want to get involved in any new tech, but recently it hasn't been leading the market here. Its Project Morpheus feels like a 'me too' VR solution —

but it'll surely work well on Playstation 4 and might actually sell well (see "What About VR"). And it's already experimented with AR in the form of The Wonderbook for the Playstation 3 (see "Try AR Today").

However, SmartEyeGlass is its foray into AR. The currently available SmartEyeGlass SED-E1 Developer Edition is very similar to Google Glass, though much cheaper at just US\$840. It uses "holographic waveguide technology" in 3mm AR lenses, which produces something very similar to Glass, with overlaid green text and diagrams operating at 15fps. It also has a 3MP camera that can take pictures or video.

It connects to compatible Android phones by Bluetooth, and is controlled by a small, ugly-looking puck that sits on the user's lapel, which also doubles as microphone, speaker, NFC and battery — which comes in at only 150 minutes. At the moment, we'd stay away from this device. It's ugly as sin, with a poor battery life and not many apps. Wait for version two.



Part of the HoloLens offering is collaborative working on projects.

APPLE OF THE EYE

There haven't been any official reveals of Apple's research into VR, but then Apple is more tight-lipped than a close-mouthed clam ahead of any announcement. Apple does have several patents for AR tech — there's a very interesting one for a 'transparent electronic device' that sounds very much like an augmented reality device. Examples in the patent include using the device to overlay information about a museum exhibit. Interestingly, the device would be able to opaque itself, and only display selected elements of the background world, otherwise being a normal opaque LCD or OLED display.

That said, an analyst from the US investment bank Piper Jaffray (annoyingly but understandably, investment bankers get a lot more access to tech firms than journalists do) published a report in March saying he believes Apple has a small team experimenting with the AR space, but that they think consumer AR is still 10 years off. We'll see from Microsoft and Google efforts whether they're wrong — but they might be on the money when it comes to mass market success.

THE STATE OF THE ART

As that US\$120 billion valuation by Digi-Capital might indicate, there's a lot of hype around AR and VR at the moment. Hundreds of firms are trying out strange new tech to augment the sensation. For example, Bristol's UltraHaptics uses targeted ultrasound vibrations on a user's skin to form tangible shapes and textures from thin air, so the users can feel them without the need for worn equipment. That, combined with the hand-detecting Leap Motion device, makes for

delicately convincing sims, like brushing your hands over ghosts. For VR, we've seen every type of treadmill under the sun — giant balls, resistant pads, harnesses around the waist — anything to convince you that you're in the virtual world.

On balance, the hype is justified. It's not like the first tablets, when Microsoft launched them stillborn into the market. Too many big companies are competing here for this to not be a success for one of them. But challenges remain, and they're not insubstantial. The biggest are in shrinking the tech down to a headset, or headset and pack model; in maintaining persistent simulations while doing that; and in preventing object-placement errors. It's likely that, after all this experimentation, mobile phones will be the first devices that give us a taste of this. As always in that field, Apple will be the firm to watch. That said, Google's Magic Leap investment is considerable enough and the tech advanced enough that we'd cautiously predict it'll be first to market, albeit in a reduced form.

One prediction we're happy to make is that in 20 years time we'll be looking back at this, the way we now look back at the first mobile phones. This technology is going to revolutionise many things — anything that requires 3D knowledge, such as architecture or warehouse management; anything that requires management of large data sets, like programming; and anything that just wants to look pretty, like art or video games. We just have to wait for the hardware to catch up.

THE AR HARDWARE

Not all AR devices share the same hardware and software, but there are some basic technology aspects they do need. First off, you need a processor to work everything out, a transparent display to show the world and the projections, a light power source, plus a variety of sensors and input devices.

The sensors can take several forms, but are mostly included as standard in mobile phones. An accelerometer lets you measure impetus, a GPS measures global location, and a magnetometer or solid-state compass measures the device's orientation against the Earth's gravitational field — that is, the ground. Luckily, modern smartphones contain all of those things.

For AR technologies that aren't based on mobile phones, if you want all these elements, they have to be built in, which can increase the size and cost of the device substantially. If you choose to go without them, you'll lose a huge amount of functionality. It's notable that Sony's AR glasses system has a relatively large external box clipped to the user's lapel, while both HoloLens and Magic Leap have been demoed with large tabletop external units that were actually running the tech.

Input systems are another challenge. Unlike with VR, the user can see their hands, so a keyboard is an option. But also unlike VR, AR encourages users to be mobile. You want to look around the object and touch it, so you want your hands to be either free or holding interactive objects (like Valve's twin pointers). That means the device has to be wireless and the interface has to be voice, gaze or mediated touch. ■

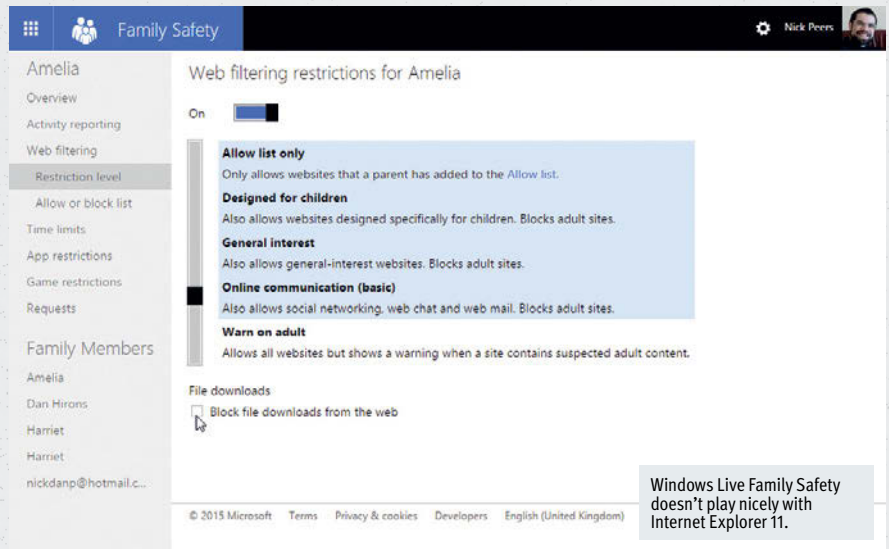
HELP STATION

GET THE MOST FROM YOUR TECH

[THIS MONTH IN HELP STATION]

- 78 **Q&A**
[YOUR QUESTIONS ANSWERED]
- 82 **Windows**
[AUTOMATICALLY UPDATE YOUR WINDOWS APPS]
- 86 **Mac**
[EASILY BATCH-PROCESS PHOTOS ON MAC]
- 88 **Android**
[REMOVE UNWANTED BLOATWARE ON ANDROID]
- 90 **iOS**
[TRACK YOUR HEALTH IN IOS 8]
- 92 **Download & stream**
[IMPROVING BITTORRENT SPEEDS OVER A VPN]
- 94 **Security & privacy**
[HARDENING YOUR BROWSER]
- 96 **Home networking**
[GETTING THE MOST OUT OF YOUR NAS]
- 98 **Photography**
[CORE PHOTOGRAPHY SKILLS: EXPOSURE]
- 102 **Home AV**
[ARE DVRs STILL RELEVANT?]
- 106 **Tech frontiers**
[HOW SMART WATCHES WORK]

Larger external hard drives like this require a dedicated power brick, whilst portable models can usually run off a USB port.



Windows Live Family Safety doesn't play nicely with Internet Explorer 11.



[INTERNET]

Tools menu causes IE to freeze

I've recently noticed if I click the Tools menu in Internet Explorer 11 on my 64-bit Windows 7 PC then the program freezes and I'm forced to end it using Task Manager's Processes tab. I've tried a number of things, and can access the 'Internet Properties' via Control Panel. The problem affects all four accounts on the PC. Do you have any suggestions?

[STEVE BIRLEY]

Nick Odantzis replies: Steve had already run full malware scans, tried rolling back to Internet Explorer 10, clearing out the cache, resetting Internet Explorer to its default settings and disabling all add-ons — all with no success, unfortunately. However, the Windows Live Family Safety tool — installed as part of Windows Live Essentials — is known to clash with Internet Explorer. Steve admitted he had experimented with it before abandoning it in the background. We directed him to the 'Program and Features Control' panel. From here, select 'Windows Live Essentials', then opt to remove one or more programs before ticking 'Family Safety' to uninstall it. On doing so, Steve was able to confirm Internet Explorer was now behaving itself again.



[HARDWARE]

Powered or unpowered?

I'm in the market for a new external hard drive, and my investigations reveal that some models come with a mains plug, while others draw their

power from the computer. Is there any reason why I'd choose a powered drive over an unpowered one?

[JONATHAN PORTER]

Matt Hanson replies: Ultimately your choice is determined by the size of the drive you want: smaller 2.5-inch hard drives — designed for laptops — tend to draw their power from the computer's USB port for portability reasons, while 3.5-inch drives use a separate power supply. If you need more than 2TB storage, you'll have to buy the larger 3.5-inch drive. In most cases, a single USB port should be ample to provide both power and the interface for a portable drive, but sometimes you may need to use a Y-shaped adapter with two plugs that will require two USB ports for that drive.



[INTERNET]

Help people use your new email address

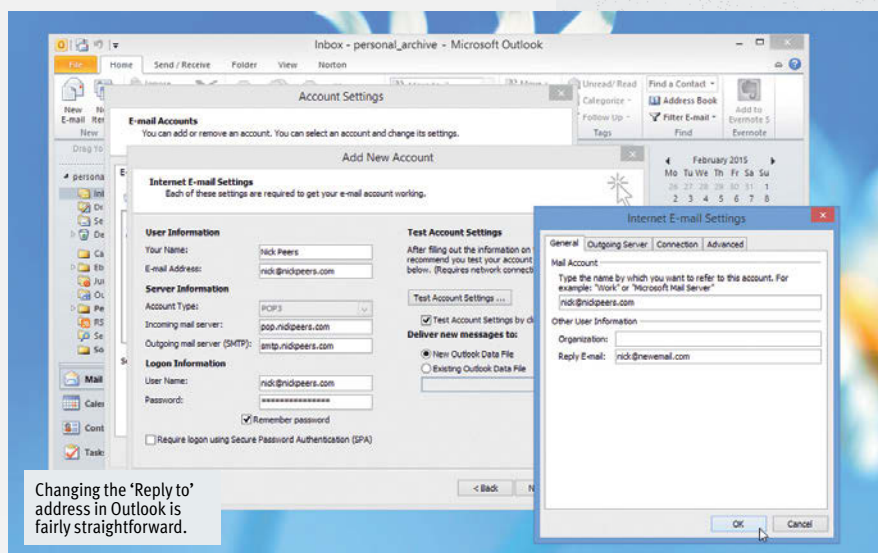
For various reasons, I need to migrate to a new email address — what's the best way to ease people into the change?

[GILL HEATH]

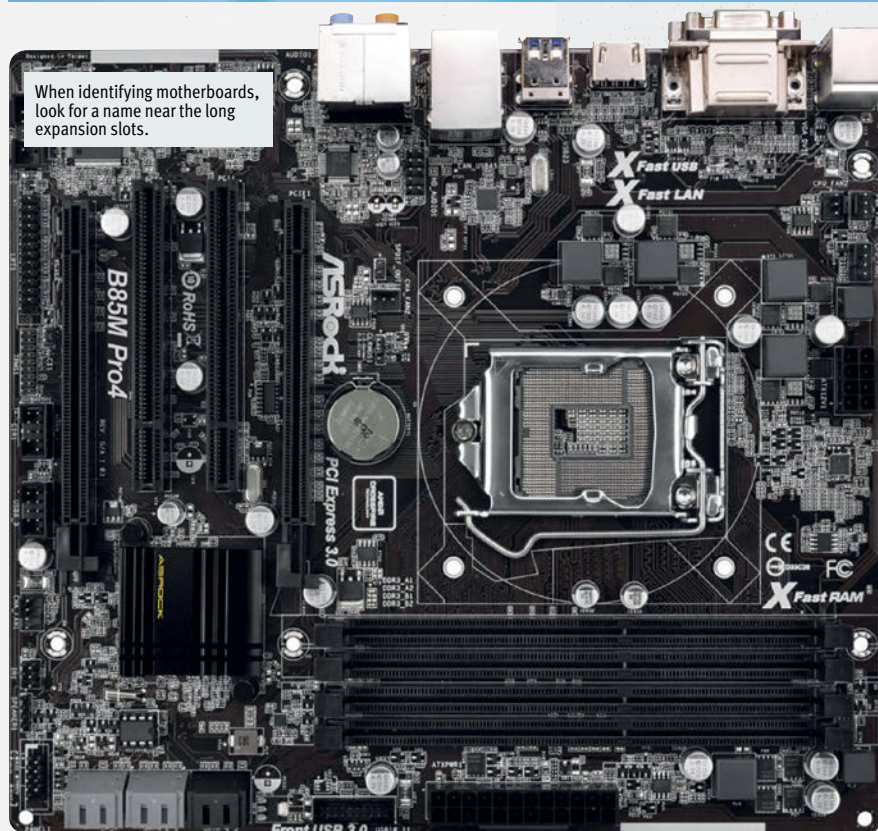
Nick Peers replies: First, change your reply-to address, so the conversation is re-routed to your new email address after your first reply. And two, create a signature informing people of your imminent address change. Here's how to do it in Outlook.

01

Switch to the File tab and click 'Account Settings' (choose 'Tools > Email Accounts' in Outlook 2003). Select your account and click 'Change or Modify' followed by 'More Settings'.



job will be far simpler as all you need to do is visit the manufacturer's web site on another PC, then download the required drivers (Ethernet and chipset in this case). Transfer them to your main PC using a USB stick and then run the installer — once complete, you should have internet access again. Things get trickier if you don't know this information. Try installing Unknown Device Identifier from www.zhangduo.com/udi.html — it should flag your unknown equipment as red, and provide you with additional details, such as information about the manufacturer and possibly even a model number. You can't use the Find Driver tool without an internet connection, so search Google on another computer using the information you've gleaned to see if you can track down a driver. If all else fails, open up your PC case to try and locate any identifying marks on the hardware in question — in most cases, the Ethernet controller is part of the motherboard, so look for its model number or serial number, then enter those into a Google web search, or take the information you've found to the manufacturer's web site or user forums for extra help.



Type your new address into the 'Reply email box' and click OK.

02 Next, create a new message. From the Message tab, click 'Signature > Signatures' (in Outlook 2003, click the Options' drop-down menu and choose 'Email Signatures'). Signatures are linked to individual accounts — make sure your account is selected.

03 Click 'New', give your signature a suitable name and click OK. Now type your signature into the 'Edit Signature' window — use this space to make it clear your email address is changing, and ask people to start using the new one.

04 If you store your new contact details in your Outlook Contacts, you can include this as a .vcf attachment in your email — click Business Card to select it. Your contacts can then simply click this to add your new address to their contacts.

My network driver is missing

My reinstall of Windows 7 Pro went well until I tried to reconnect to the internet. On investigating further I've discovered two error codes: 28 and 651. I then looked in Device Manager only to discover that both PCI and Ethernet controllers are without drivers. I don't know how this happened, but would be grateful if you could tell me how to correct this.

[RONALD BROWNE]

Graham Barlow replies: It sounds like the reinstall was done with a standard Windows 7 installation disc, rather than via a manufacturer's recovery tools. If so, this explains the missing drivers. We don't know Ronald's PC make and model, but if you know this then your



[iOS]

Shrinking iPhone storage

My daughter has just bought a 32GB iPhone 5s. On syncing music files with iTunes on her MacBook Air (just music files) there is now 8.2GB of 'Other' on her iPhone. We now notice that there is 26GB of 'Other' on the Air. How can we reduce these sizes?

[TONY FURNISS]

Matthew Bolton replies: If your daughter's phone doesn't have room for any more apps or music — that's when you start looking for ways to free up some storage. But if it's just something that you would never have noticed was a problem unless iTunes told you about it, then it's best just to ignore it. Having said that, 26GB is a very large number. There are three main ways for Other to grow: legitimate temporary storage from apps, misappropriated storage due to bugs in apps, and legitimate storage that gets misclassified as Other due to a corrupted sync. With 26GB of Other, I would strongly suspect the last category. Cleaning apps don't do nearly as much as they claim to do and a full factory reset is overkill, too. An ordinary backup and restore should be enough to fix this.



[WINDOWS]

Saving old hardware

I've upgraded to Windows 8.1 from Vista, and everything's gone smoothly except I can no longer use my Canon laser printer (LPB5200) or scanner (Canoscan 9900F) as no

Older hardware may not work with 64-bit versions of Windows.



drivers were produced for either. Do you have any tips or workarounds that will enable me to use them in Windows 8.1?

[RICCARD PARSONSON]

Mayank Sharma replies: This problem usually occurs when you migrate from a 32-bit to 64-bit platform and affects older equipment. We tracked down a 32-bit driver for Riccard's printer, marked Windows 8.1 compatible, so one option would be to wipe his hard drive and reinstall Windows 8.1 using the 32-bit disc that comes with Windows 8.1 when purchased on DVD. You might then also have success with your scanner by installing the Windows Vista driver that's available online. Even if you can't locate a working driver for your scanner, the good news is that you can keep it going in Windows 8.1 (32-bit or 64-bit) by installing VueScan from www.hamrick.com. This software works with hundreds of older scanners — including the Canoscan 9900F — but will cost you \$30 to purchase once you've confirmed the trial version works. A final option is to install a virtual version of 32-bit Windows XP, Vista or 7 inside

VirtualBox in order to use the printer exclusively through that, but it's not an elegant solution as the old Windows XP Mode in Windows 7 Pro, which makes us think installing the 32-bit version of Windows 8.1 is Riccard's best bet.



[HARDWARE]

Is an old iPad worth hanging on to?

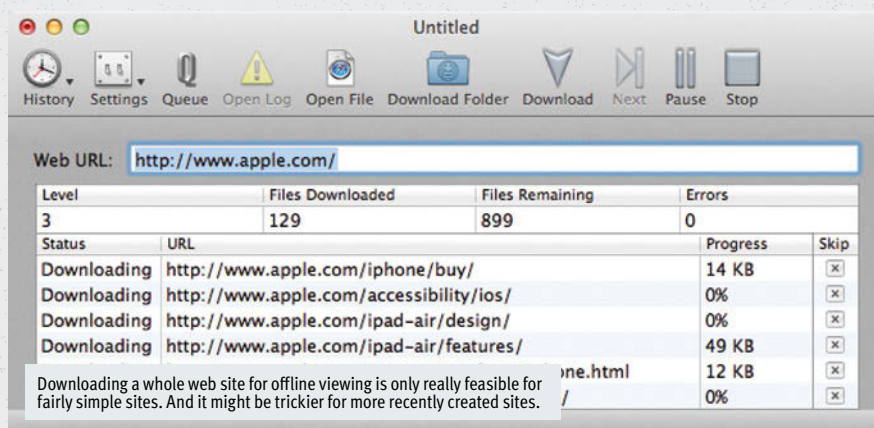
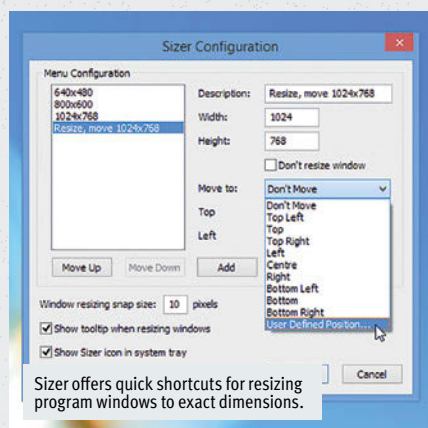
I've upgraded my original iPad 1 to an iPad mini. I use the mini for surfing the web and reading, but I'd like to find something useful to do with the old iPad (32GB, Wi-Fi-only), which is still functional. I've considered using it as a second screen for my Mac mini. Is this something you'd recommend? If so, what's the best stand to use?

ALEX HADDERSLY

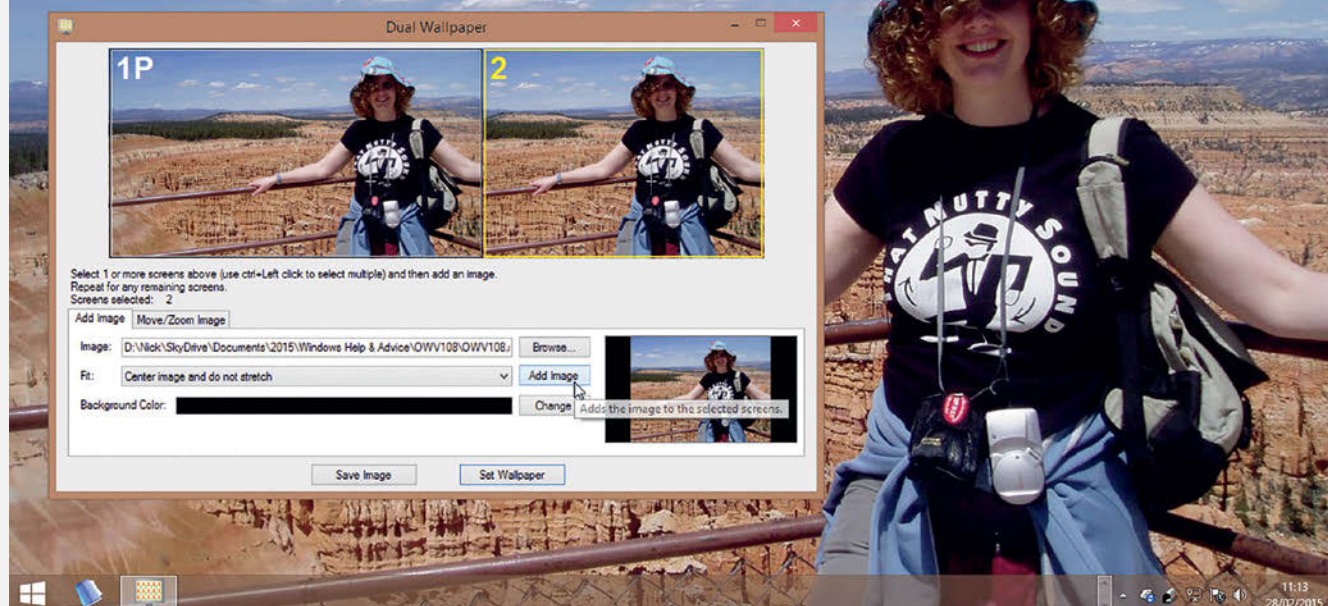
Luis Villazon replies: I have a first generation iPad that I use as an extra display, but it's not as useful as you might think. For a start, you need an app to send the display updates from your Mac. The best one we've found (that supported the original iPad) is Air Display by Avatron

Gooseneck stands are good when you want to use an iPad as a second monitor.

(getairdisplay.com), but unless you've already downloaded this, you've missed the boat. The current version requires iOS 6, which won't run on your iPad, and version 1 isn't available anymore. DisplayPad is an alternative (displaypadapp.com) and it's cheaper at \$3.79, but we don't think it's quite so responsive. Screen lag is a problem with monitor extender apps because they use Wi-Fi to send screen data. You can use it to move email off your main monitor (or for a YouTube video) and it's tolerable for that, but there's no point sending display updates from the Mac for this because you could just use native apps on the iPad for this. Personally, I would advise selling old iPads. You might get up to \$100 on eBay. You could put that towards a proper second monitor, if you really want one. The first-gen iPad is heavy enough that you need a pretty solid stand to hold it securely, like the



Place a custom wallpaper on your dual-screen set-up.



Belkin A-frame. But for your iPad mini, you can use something more fun, such as the BESTEK Gooseneck (US\$30 on Amazon).



[WINDOWS] Resize program windows quickly

My projector chops off the sides of my laptop screen when presenting documents. Is there any way to fix this?

[JILL WESTBURY]

Nick Odantzis replies: This occurs because your projector's maximum resolution (1,024 x 768) is less than your laptop's (1,366 x 768). To work around the problem, follow these steps to resize and position program windows automatically to compensate.

- 01 Download and install Sizer, a free program that allows you to quickly resize and reposition most open windows simply by right-clicking the bottom right-hand corner of its window. You can find it at www.brianapps.net/sizer.
- 02 Launch Sizer from the Start menu or Windows Search. You'll see a four-way arrow appear in the Taskbar Notification area — right-click it and three available sizes will appear in the pop-up menu. Select 'Configure Sizer...' to add your own.
- 03 Click the Add button to create a new entry called '640x480'. Select this and change the width to 1,024 and the height to 768. Give it a suitably descriptive name, then click the 'Don't Move' dropdown menu and select 'User Defined Position...'
- 04 For a 1,366 x 768 display, leave 'Top' set to 0 and set 'Left' to 171 to place the window perfectly in the centre of the screen. Click OK, then test by opening the desired program, right-clicking its window and choosing your new setting.

[WWW.TECHLIFE.NET]



[INTERNET] Downloading the internet

Is there any way to copy an entire web site to my Mac? I belong to a few groups for various hobbies, and sometimes the web sites just go offline for weeks at a time. It'd be great to have my own local copy that I can browse by myself.

[ANDREW STRICKLAND]

Luis Villazon replies: Safari can save a page at a time, for offline reading, using the Add to Reading List feature. But that doesn't follow the links to all the other pages on that site. However, there's an app called SiteSucker (\$6.49 on the App Store) that downloads an entire local copy of a web site. It doesn't handle web pages with cascading style sheets and JavaScript very well, though. In fact, it ignores Javascript altogether. This could be a problem for most web sites created in the last five years, but I suspect that isn't going to be as much of a problem for you. Any web site that can go offline for several weeks probably isn't coded with the latest web technologies. I imagine these must be privately hosted sites running on someone's home PC and they disappear whenever they happen to exceed their monthly bandwidth cap. Have you considered suggesting these groups move to WordPress or SquareSpace? It would be much more reliable.



[IOS] Keep the apps, dump the tunes

I want to take the music off my iPhone, but I want to keep all my apps, so I don't want to do a complete erase and sync. Is there a better way?

[GLEN SHORTER]

Matthew Bolton replies: On your phone, tap

'Settings > General > Usage'. Select Music from the list of things taking up storage and tap Edit. Delete 'All Music'. Or, do the same via iTunes by unchecking 'Sync Music'. Select your phone from Devices and click Music at the top. Sync Music is on this screen; click Sync to remove the music from your phone.



[WINDOWS] Create dedicated projector wallpaper

My club uses an XGA projector to project images from a PC. Recently we upgraded to a laptop, which has a WXGA display. We used to mirror the desktop from the old PC to the projector, but have had to switch to an extended display as the XGA projector would chop off the sides of the laptop image. The new system works well, but our custom wallpaper is truncated when shown on the projector. How can we resolve this issue?

[TREVOR COURTNEY]

Mayank Sharma replies: We'd suggest opening your laptop's desktop wallpaper in an image editor, then creating an XGA (1,024 x 768) resolution version of that wallpaper through a combination of cropping and resizing so it fits on-screen — save it as a separate copy. Now go to dualmonitortool.sourceforge.net/ to download and unzip Dual Monitor Tools. Then simply run the Dual Wallpaper component to set up your dual displays. First, make sure your laptop display is selected, then click 'Browse' to load your original wallpaper. Click 'Add Image' to add this to the display. Next, click on 'display 2', then click 'Browse' to load your cropped wallpaper image. Click 'Add Image' and you'll see it appear in display 2. Click 'Set Wallpaper' and the correct wallpaper will appear on both screens. ■

[WINDOWS]

Automatically update your Windows apps

KEEP VULNERABLE SOFTWARE UP TO DATE AUTOMATICALLY – AND KEEP MALWARE AT BAY!

[ED RICKETTS]

THERE ARE STACKS of antivirus, anti-malware and other security products on the market, and it's important to have one you trust installed and working at all times. Heimdal is a little different, though. It's a small, lightweight program that's designed to work together with your existing antivirus program, and continually monitors any third-party software installed on your PC that might be vulnerable to hacks.

Upgrade to the paid-for Pro version and Heimdal can do even more. It analyses and blocks malicious links to keep you safe from phishing attempts, scans for and deletes malware, and checks all internet traffic to ensure that sensitive data, such as passwords and credit card details aren't being sent to known hacking servers. Let's see how both the free and Pro versions of Heimdal work...

+

HEIMDAL IS A LITTLE DIFFERENT, THOUGH. IT'S A SMALL, LIGHTWEIGHT PROGRAM THAT'S DESIGNED TO WORK TOGETHER WITH YOUR EXISTING ANTIVIRUS PROGRAM, AND CONTINUALLY MONITORS ANY THIRD-PARTY SOFTWARE INSTALLED ON YOUR PC THAT MIGHT BE VULNERABLE TO HACKS.

01 OVERVIEW

Gives you an at-a-glance look at the state of your PC's health according to Heimdal, with a percentage score for safety.

02 KEEP IT CURRENT

The Software tab shows you which plug-ins are being monitored on your PC and whether they're up to date.

03 STOP THE ROT

The Malware tab is pretty simple — most of the time (hopefully!) it should be empty, indicating no malware has been discovered.

04 KEEPING TABS

Statistics shows you everything that Heimdal has done up until now, including updates applied and so on.

05 TWEAK IT

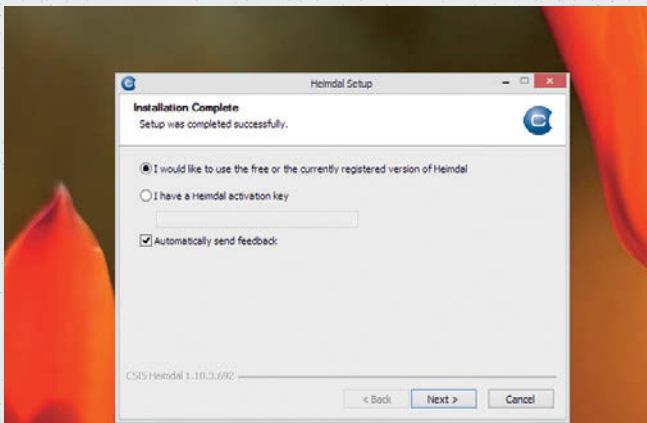
In Advanced, change parameters such as how often Heimdal scans your PC and whether to update software automatically.

06 TURN IT OFF AND ON AGAIN

Modules enables you to turn on and off specific parts of Heimdal individually, such as malware detection.

[STEP BY STEP]

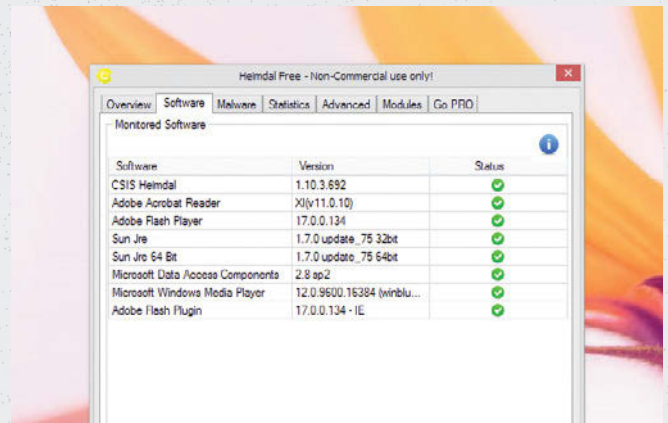
USING HEIMDAL



01

GETTING THE SOFTWARE

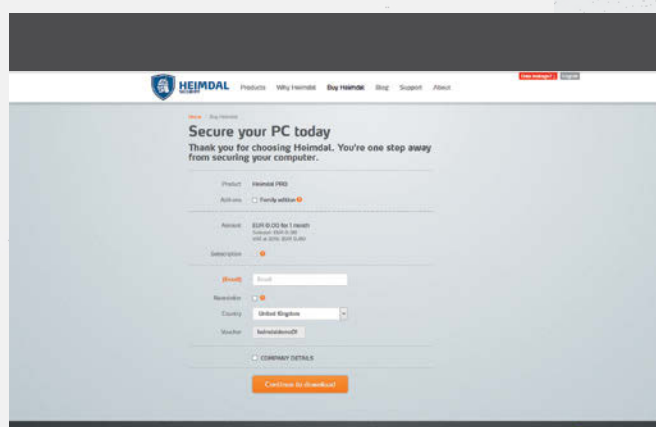
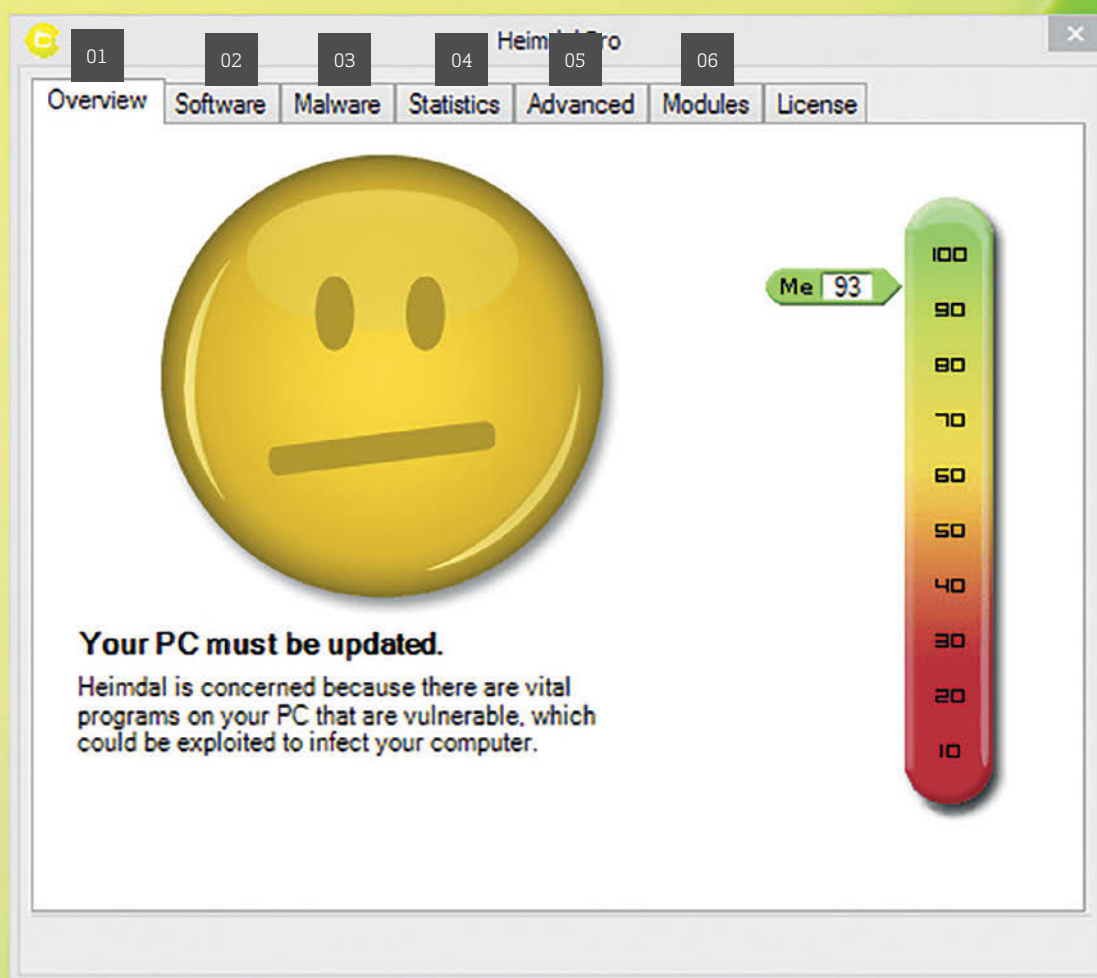
Heimdal Free is a tiny program, which you can find at heimdalsecurity.com. From the web site, just click the 'Get It Now' link, then download the file and run it. During setup, make sure you choose the option 'I would like to use the free or currently registered version of Heimdal' to install the free version. We'll also look at a way to try the Pro version.



02

FIRST RUN

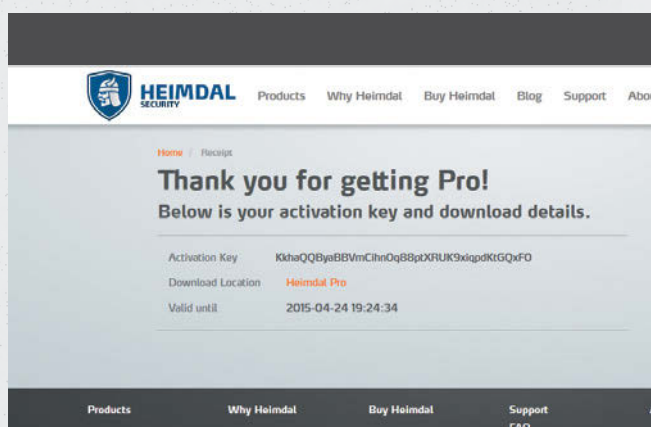
When Heimdal Free first starts it'll do a scan of your PC to look for known vulnerable programs — particularly plug-ins such as Adobe Flash, which are constantly being updated. By default it then automatically downloads updates for any that need it; click the Software tab to see what's been done. There isn't much else you can do with the Free version, so let's go Pro...



03

GET A PRO TRIAL

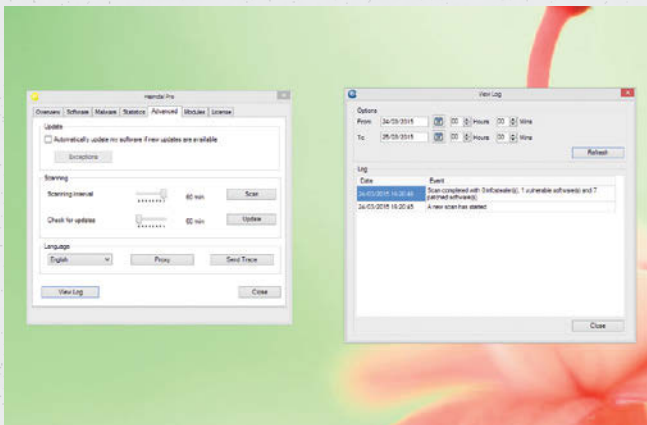
Although the Heimdal Security web site doesn't shout about it, there's a way to get a free month's trial of Heimdal Pro. Go to the web site and click the 'Buy Heimdal' link. Change Country to 'United Kingdom' and in the Voucher field, enter `heimdaldemo01`. Click Apply and the price changes to 'EUR 0.00 for 1 month'. Now enter your email and click 'Continue to download'.



04

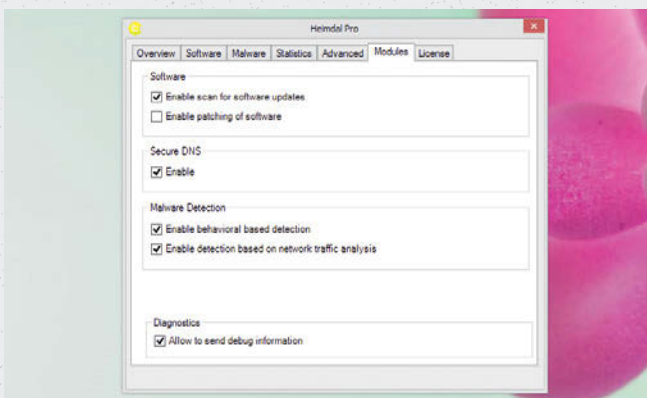
ACTIVATE

The next screen displays your activation code for the free month's trial — copy and paste this and keep it somewhere safe! You'll also see the date your trial expires. There's no need to download the software again — your activation key works with the free version you've installed. Just copy and paste your key in the Go PRO tab of the software to activate it.



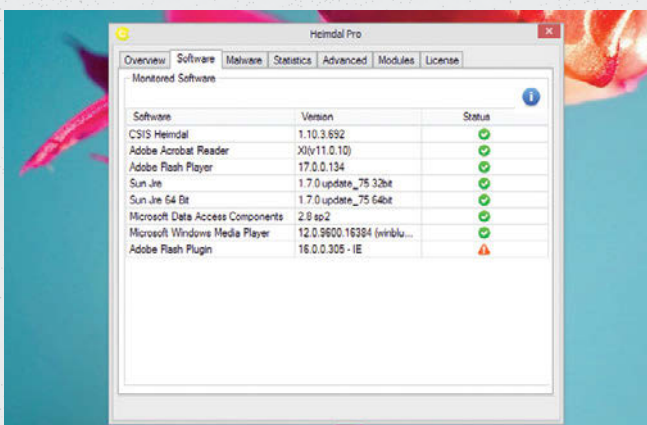
05 FINE-TUNING

You can go to the Advanced tab to customise Heimdal's operation. If you don't want automatic download updates but still want to know about any that are available, untick the box under Update. You can change the frequency of scans for PC checks and software updates — the default 60 minutes is a bit excessive. 'Proxy' and 'Send Trace' are advanced options for special cases.



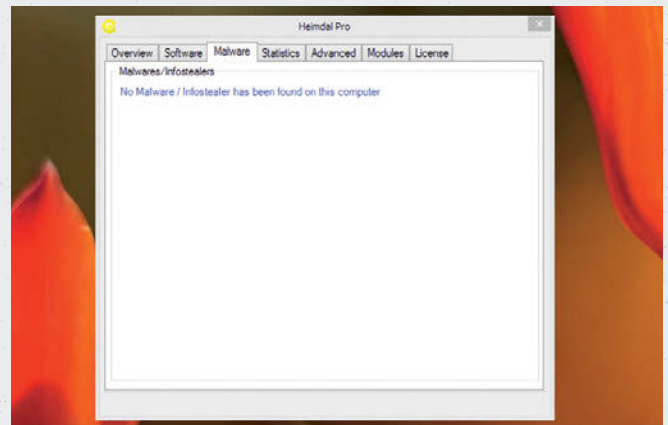
07 CUSTOMISE AT WILL

In the Modules tab, turn on or off parts of Heimdal. The Software section is similar to the options in Advanced. Having 'Secure DNS' enabled means Heimdal can check ingoing and outgoing traffic to ensure data isn't being sent to known phishing sites. 'Malware Detection' lets it look for suspicious behaviour on your PC, as well as unusual network activity.



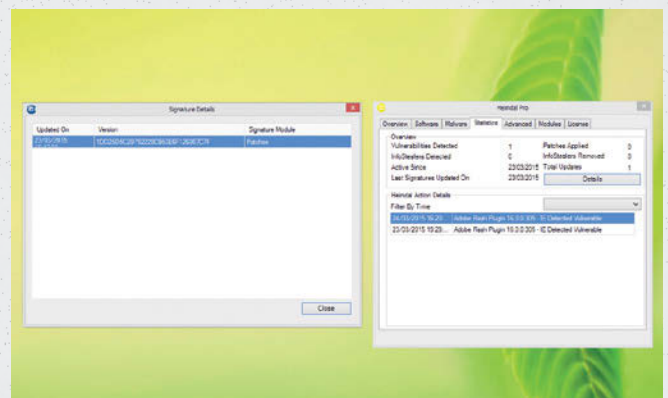
09 ALERT, ALERT

Occasionally Heimdal won't be available to automatically update certain programs itself, particularly more complicated ones such as Flash browser players, which often need to be installed manually. In that case, you'll see the red '!' icon in the Software tab, indicating a failed update. Try to update it yourself as soon as possible by going to the relevant site such as adobe.com.



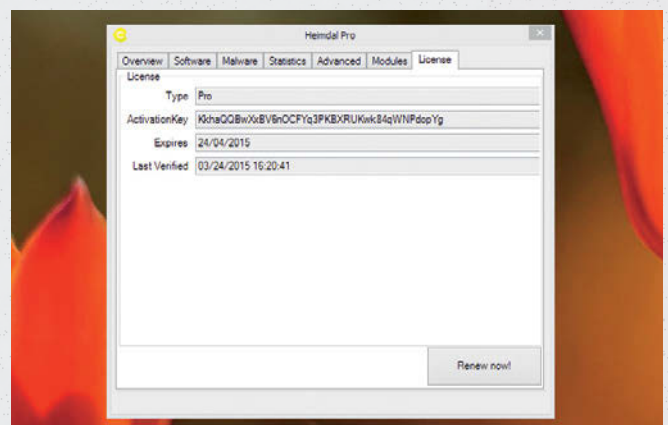
06 BADNESS BEGONE

In the Malware tab, there should be very little to see — at least, that's the ideal! If Heimdal does detect any known malware or 'info stealers' (programs that try to steal your personal details such as passwords) on your PC, it will attempt to eradicate them and pop up a message to let you know. You can check out exactly what it's done in this section.



08 WHAT'S GOING ON?

The Statistics tab shows you everything that Heimdal has done to date, including vulnerabilities detected, any software updates it has applied, and when it last updated its own data or signatures. Click the Details button to see a full list of all updates Heimdal has applied to itself. Here, it detected a vulnerable Flash plug-in twice, because we've turned off automatic updates.



10 WANT MORE?

Finally, the License section (only shown in the Pro version) displays your activation key, the date your licence expires, and when the software last verified the licence over the internet. If you find Heimdal is useful, remember you can always buy the full version after your month's trial expires — it costs €34 for a year's subscription. Just go to the main Heimdal web site to purchase. ■



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[SPECIAL OFFER]

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[MAC]

Easily batch-process photos on Mac

RESIZE, RENAME AND ORGANISE YOUR PHOTOS IN NO TIME AT ALL WITH AUTOMATOR.

[ROSIE HATTERSLEY]

MANY OF THE things you do on your Mac will be routine. You'll log in to your Mac user account, check your Mail, launch Safari and go to your favourite web sites, then open Pages or Word to start your day's work. If you've got Mail set to show your latest emails or Safari set to a certain homepage you've already saved time.

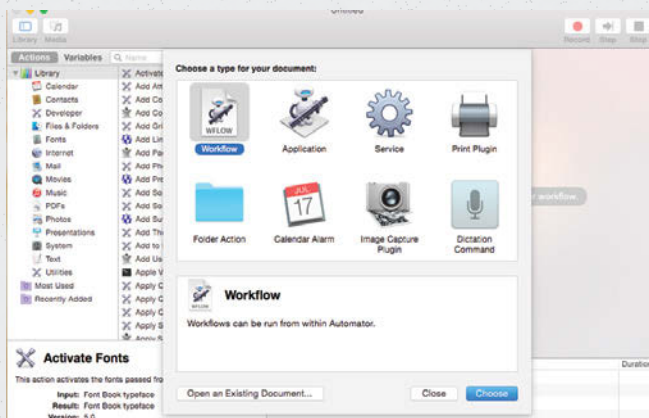
Other tasks can also be set to run automatically using the Automator scripts built into Mac OS X. You can use it to create lists of actions that your Mac runs through in response to a trigger or when you tell them

to begin. The Automator utility has been available in since OS X 10.4 (Tiger) and it received a useful update in Yosemite, with some more user-friendly actions.

Since many of us like to take photos and store them on our Macs for safekeeping, setting up a script to help organise and batch-edit them seems like a worthy timesaver. Here, we look at how to resize, rename and archive photos, and to get Automator to perform these tasks without you having to manually do each and every one.

[STEP BY STEP]

GET AUTOMATOR TO REORGANISE YOUR PHOTOS



01

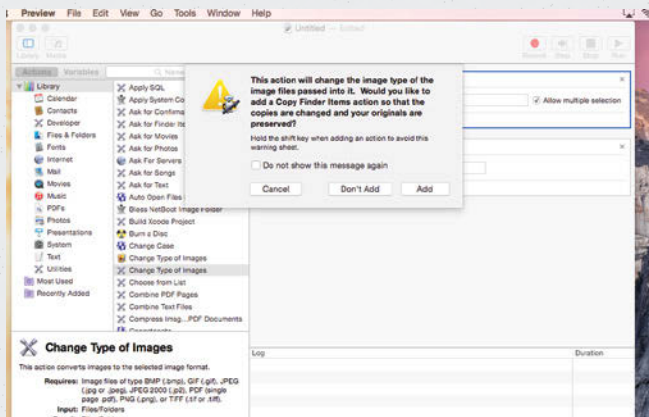
SET UP A WORKFLOW

You'll find Automator in the Other folder in Launchpad on your Mac. Click to open a blank pane and the option to create a new document. Now choose the type of Automated item you want to create. In our case, it's Workflow, since we want to set up a sequence of events

02

CREATE AN ACTION SEQUENCE

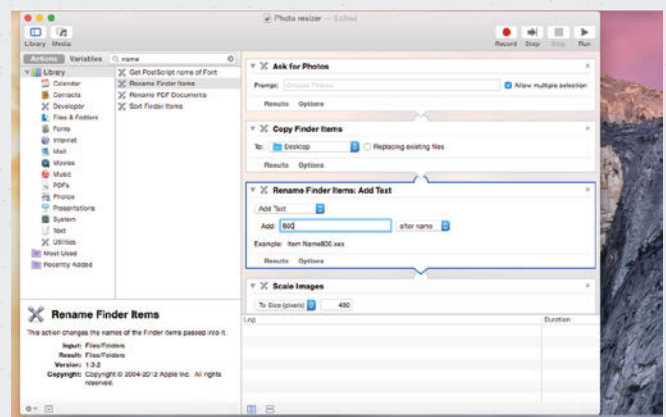
You'll now see a list of actions. Find the item you want, by scrolling or using the search option based on its name or a keyword. When you find an action, drag it to the blank pane on the right. You can reorder actions at any point by dragging an item above or beneath another in the list.



03

PLAY IT SAFE

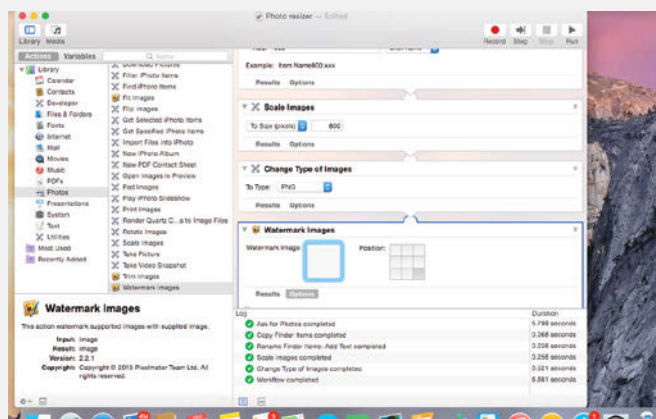
We've chosen Ask For Photos, Scale Images and Change Type of Images as our main actions. Automator asks whether we want to work on the original images or a copy. Choose the copy. You'll see the Copy Finder Items action doesn't have 'Replacing existing files' ticked.



04

CHANGE THE ACTION

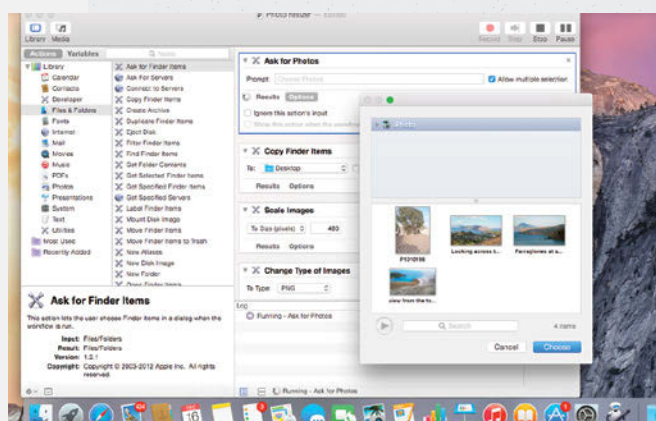
Change the outcomes for the actions you select, by changing the value in the box or list. For example, we want to turn our selected JPEG photos into PNG, so we've amended this in the Change Type of Image action. In the Resize action, we've changed 480-pixel option to 800 pixels.



05

STAMP YOUR PHOTOS

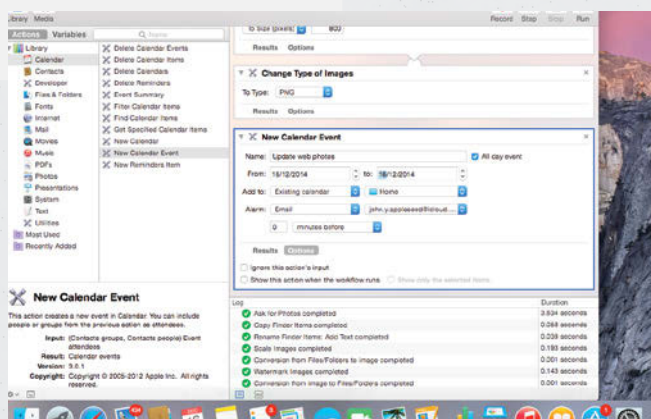
Add a watermark to batch-processed photos by choosing **Watermark Images** in the Photos section of the actions library (provided you have an app like Pixelmator or Photoshop). Click **Watermark Image** then drag a PDF or JPEG image containing your signature/web address into the box.



07

TEST YOUR WORKFLOW SCRIPT

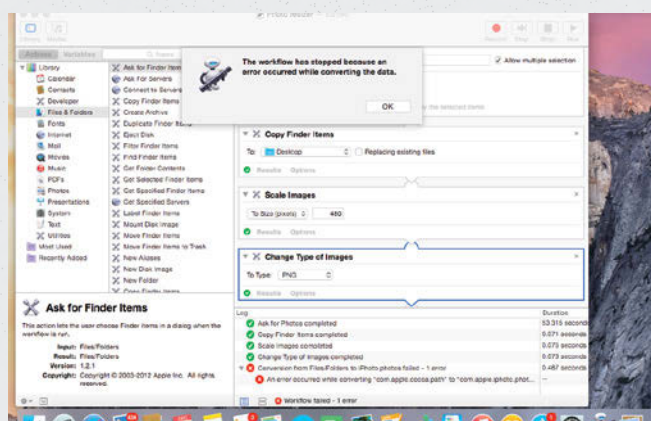
Once you've set up your action sequence, it's time to test it. First save the script and give it a name, then click 'File > Save'. Now click **Run** at the top-right of Automator. Make sure you set your action list to create a copy of your photos so you don't end up mangling one you can't replace.



06

SET UP A SCHEDULE

You can schedule Automator to perform actions at intervals or at a specific time. Click the **Calendar** option in the Library list to see the date-based actions you can use. We're sending photos to an archive for back up each month — an option in the Files & Folders section.



08

CHECKING AND CHANGING ACTIONS

When the workflow runs it should prompt you for the photos you want to work on. The sequence of actions will appear at the bottom of the window with green ticks next to all that worked. Any errors will be flagged in red. Try deleting that action and re-running the test.

THE END RESULT

We got Automator to batch-process a group of photos and output the copies to the desktop. We used a variety of actions including a prompt to select which photos to process, an image resize and a change of format. Adding the suffix '800' to the filenames of photos we ran through Automator's Image Resizer meant we were able to identify which photos had been worked on, without having to click on each one to check its file size. If you use the Folder Actions watch folder instead of initiating photo-processing on demand, you can specify an output folder, too.

Because it's so easy to use, you'll find other tasks you can automate on your Mac. For all but the simplest workflows, we recommend running the script as you add elements to the workflow list. It also makes sense to use dummy files for your test. ■



[ANDROID]

Remove unwanted bloatware on Android phones and tablets

DISABLE, REMOVE, OR RE-ENABLE UNWANTED APPS FROM YOUR DEVICE USING THE DEBLOATER TOOL.

[SIMON CHESTER]

WHILE AUSTRALIAN ANDROID devices aren't filled with quite as much bloatware as those purchased in the US, there is still often a host of system apps installed at the factory that you can't remove, even though you may not want them. Since Ice Cream sandwich (Android 4.0), users have been able to disable apps through the Apps section of the Settings menu, but if you have a lot of apps to disable, this can sometimes take a bit of time, and you may want a quick way to disable known crap apps (crapps?) whenever you install a new rom, buy a new phone, or decide to help out a buddy of yours.

XDA-Developers.com member, Gatesjunior, had such a desire, and has whipped up a program, called Debloater, that makes removing these unwanted apps a fast and easy process.

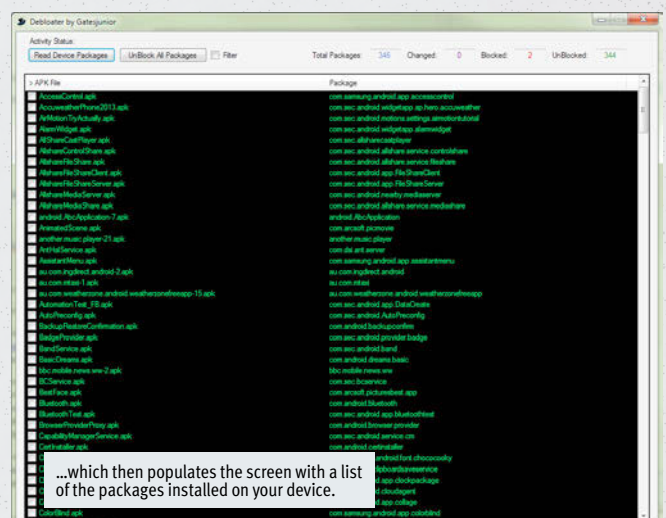
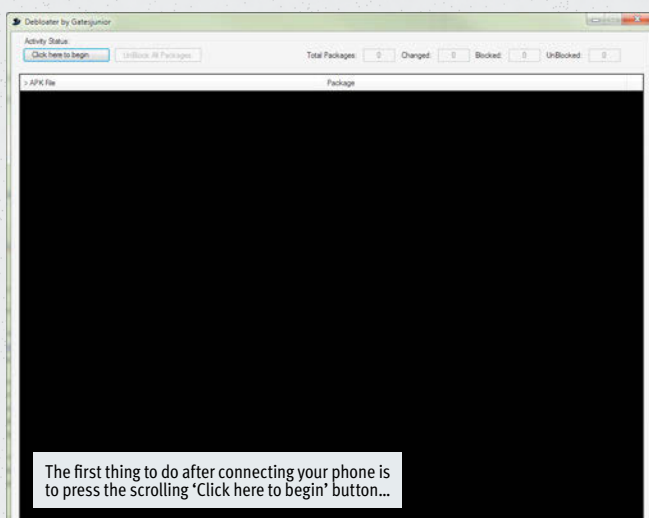
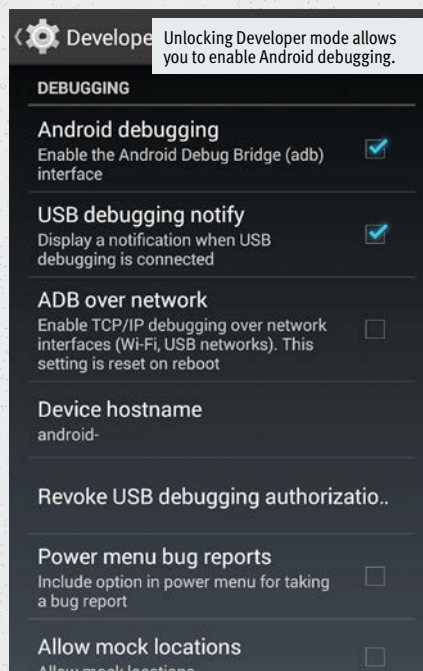
To begin, visit the XDA Forums page at <http://forum.xda-developers.com/android/software/debloater-remove-carrier-bloat-t2998294> and follow the download link down the bottom of the first page.

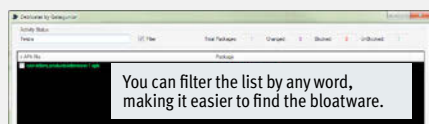
The app isn't the only requirement for running through this process, however: you also need to install the correct USB drivers for your device. These are usually available from your manufacturer's web site or a quick Google search. After installing the drivers, but before plugging in your phone, you additionally need to enable ADB (Android Debug Bridge) from within

the hidden developer's menu in your device's settings menu.

To do so, open your Android Settings menu, then scroll down to 'About Phone', then 'Build number' (usually second from the bottom), and tap it seven or so times until a toast (pop-up

message) appears congratulating you on your special developer status. You have now unlocked the 'Developer options' menu within Android Settings. Now visit said menu and scroll down to the Debugging section and enable 'Android debugging'.





Now plug in your phone. Windows should do its 'Installing new hardware' thing for a bit, and then you should be met with a message on your phone asking your permission to authorise this computer for ADB access – you need to click yes to this. If you never saw this screen, or are having problems using the program, you can reset the access permissions to trigger the pop-up the next time you plug your phone in by visiting the 'Developer options' menu and pressing the 'Revoke USB authorisations' menu item.

Now that that's all sorted, it's time to get dirty within Debloater itself.

You'll first have to acknowledge the warning that this does have the potential to prevent your phone from booting, should you choose to block an important system package from running. If you do so, you'll pretty much have to factory wipe your phone to get it working again, so *always* be sure that you've selected the correct packages before you hit the apply button.

Now that you've come to terms with your phone's mortality, the first thing to do is press the scrolling 'Press here to begin' / 'Read Device Packages' button, which should come as no surprise to anyone, which then brings up a list of every package (app) on your phone, including those annoying ones.

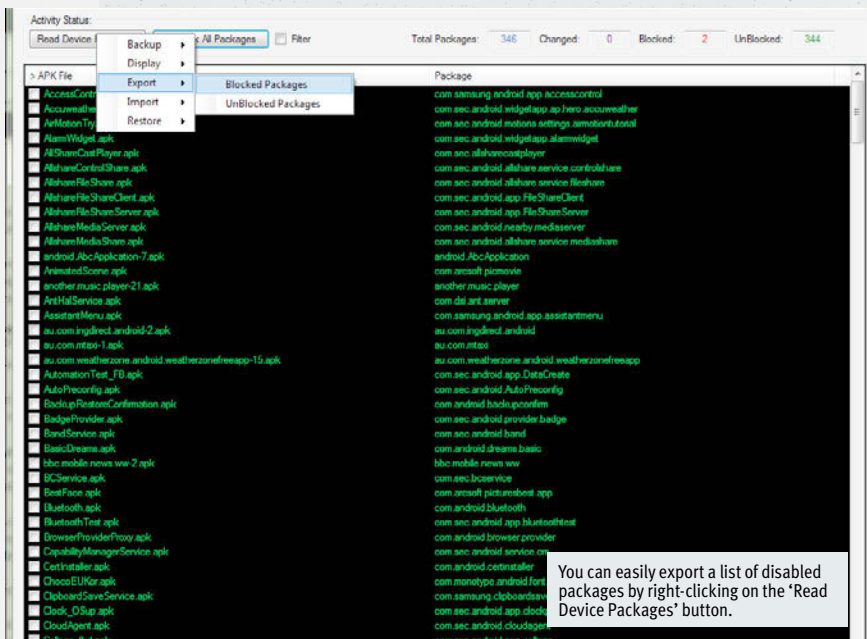
Now, this is where it becomes a handy little tool over the manual method: you can select each of the packages you want to disable, then hit the Apply button (which takes the place of the 'Read Device Packages' button when you select something from the list). Further to this, you can quickly find the package(s) that you're after by selecting the Filter option, and typing in a part of the package name (say, the name of your mobile service provider).

Now, if you are sending your phone back for repair, you may want to re-enable those packages you disabled – again, this is super easy to do in a few clicks – just press the 'UnBlock All Packages' button, then press the Apply button.

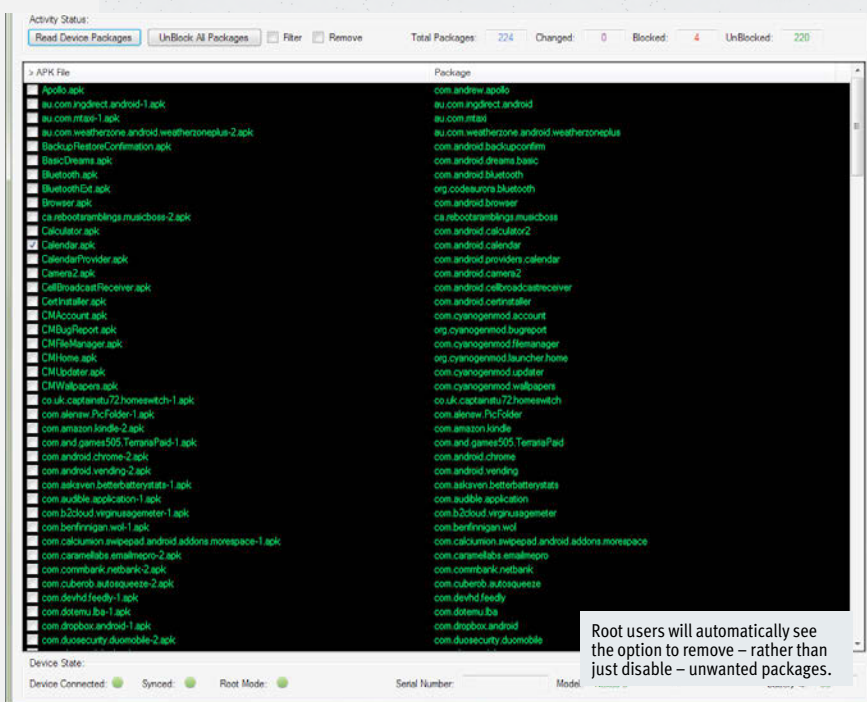
One other feature that makes Debloater worthy of note is the ability to export a list of those unwanted packages. This means that – had you re-enabled the packages for whatever reason (troubleshooting?) – you can quickly disable the unwanted packages again by loading up your list and applying it.

To create such a list, first block the packages on your phone as above, then right click on the 'Read Device Packages' button to access the options menu, then go to 'Export > Blocked Packages' and save it somewhere safe. To import, just visit 'Import > Blocked Packages' and choose the file you saved earlier.

It's as easy as that – your phone is now free from bloatware.



You can easily export a list of disabled packages by right-clicking on the 'Read Device Packages' button.



Root users will automatically see the option to remove – rather than just disable – unwanted packages.

FOR THE ROOTED

If your device is rooted (which, notably, is a requirement for KitKat or earlier), then you also have access to the option to remove (rather than just disable) any unwanted apps – just enable the Remove option, seen next to the Filter check box when a rooted device is connected.

While there isn't, as at the time of writing, any way for Debloater to restore these apps, it does make a backup of them on your PC before removing them. To restore these apps to your device, you'll have to push them back to their original directory using ADB (Android Debug Bridge, part of the Android SDK). Open ADB from the directory containing the app package (.apk file), usually C:\Program Files (x86)\Debloater\Debloater\Backup\[serial number]\system\app. Note that any directories after the serial numbers correspond to the directories where the apk came from. So, in the command line you need to type: `adb push <file.apk> /directories/after-numbers`

Note the forward slashes, as only Windows has the slashes facing the other way. You then need to fix permissions to match the other .apks in that folder. You could chmod this through adb shell, but you could also just open up your phone's file explorer (I like Solid Explorer), find the apk in the directory you just pushed it to, long press it, and change the permissions from there to match (it's most likely that they'll be "-rw-r--r--").

Hopefully, it won't be long until Gatesjunior implements this into the program, but at least there's a workaround for the time being. In truth though, until full restore capabilities are implemented into Debloater, I'd stick with just disabling apps. ■

[IOS]

Track your health in iOS 8

CHECK YOUR STATS IN HEALTH'S DASHBOARD.

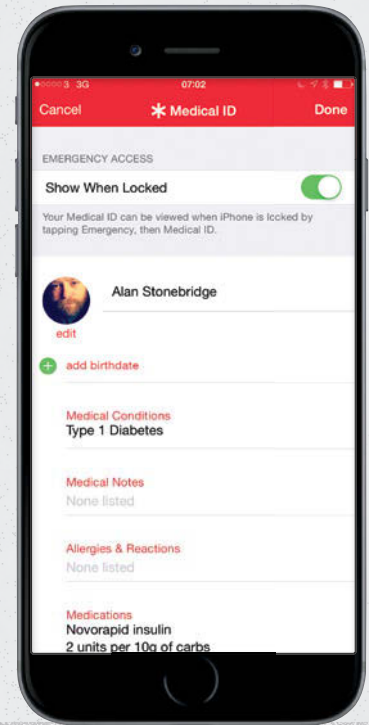
[ALAN STONEBRIDGE]

IOS 8 OFFERS a new app that gathers health stats from various sources — so you don't have to open one app for your digital scales, a different app for your fitness band, another that tracks your cycling and so on. Apple's Health app pulls this data together so you can easily check how you're doing, rather than correlating statistics from various sources and trying to analyze them.

Even if you're uninterested in the gamification of health, or if you feel you're managing to do just fine without the involvement of technology, Health has another

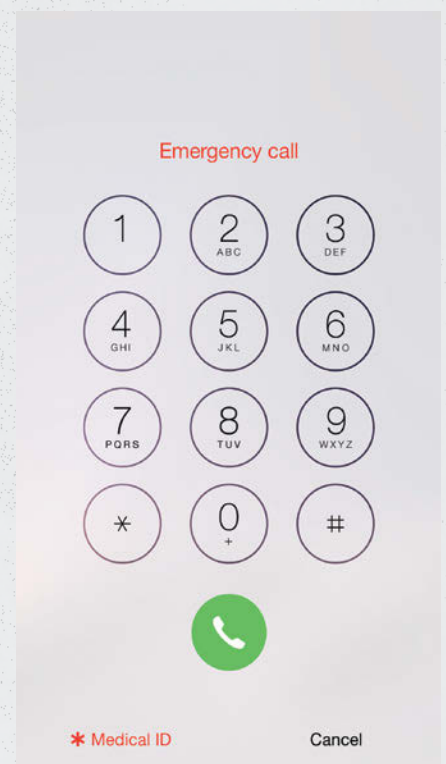
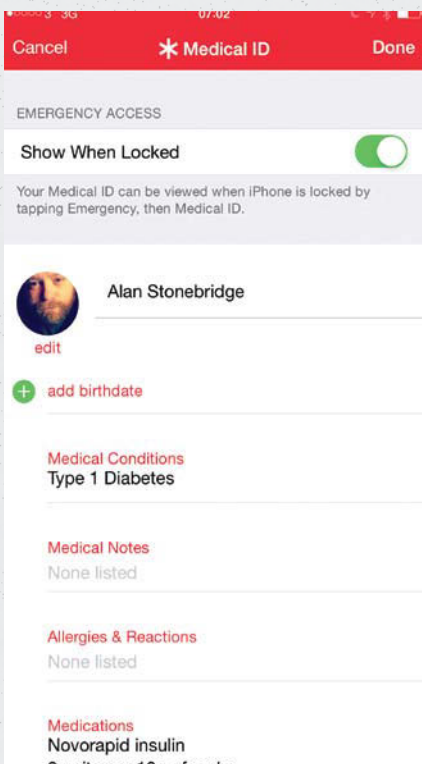
feature... It can create a Medical ID that's accessible from your iPhone's Lock screen, so that in an emergency, whoever finds you — or the medical professionals looking after you — will have access to emergency contacts, details of medical conditions or allergies and treatments that you're taking to determine the care that's given to you.

Setting up your Medical ID could be a lifesaving act — not just for you, but for someone else if, in the worst of circumstances, your Medical ID confirms that you consent to donate your organs.



[STEP BY STEP]

SET UP HEALTH FOR USE IN EMERGENCIES



01

SET UP YOUR MEDICAL ID

In the Health app, tap 'Medical ID' in the bottom toolbar, then tap 'Create Medical ID' on the page that appears. This displays a form for you to detail your age, facts and stats about your body, medical conditions, medications, and whether you are an organ donor. Fill in the form, and leave 'Show When Locked' on if you want the information to be accessible from the Lock Screen.

02

EMERGENCY CONTACTS

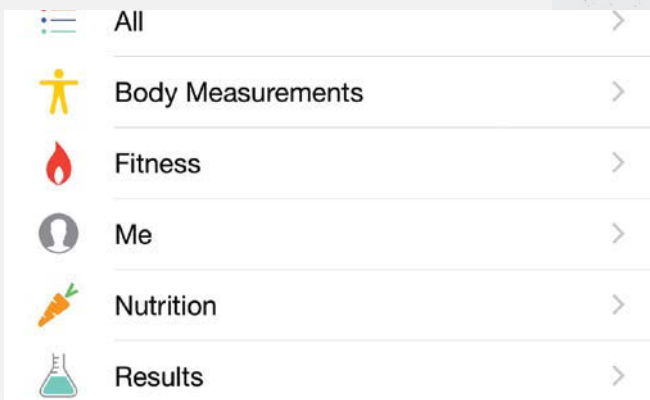
As well as providing medical details, your Medical ID can display contact info for anyone who you want to be informed about your situation. You can add contacts from the people in your Contacts app. You can also define their relationship with you, such as spouse, parent, sibling, child, friend, colleague, and doctor, so that professionals can reach the correct people.

03

HOW TO ACCESS THE ID

Now, if someone should find you in an unresponsive state, they can wake your iPhone and slide a finger across the screen to reach the passcode entry screen. Tapping Emergency (bottom left) takes the person to a keypad so they can dial the emergency services, but they'll also see a link that, when tapped, displays the information you added to your Medical ID.

MONITOR YOUR DAY-TO-DAY HEALTH

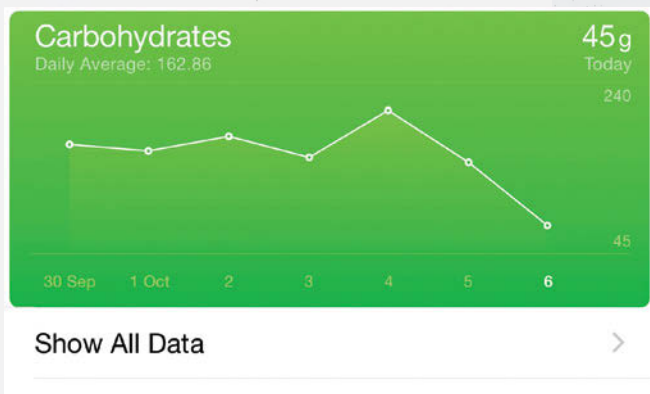


01

MONITOR OPTIONS

The Health toolbar can be used to record and review your well-being.

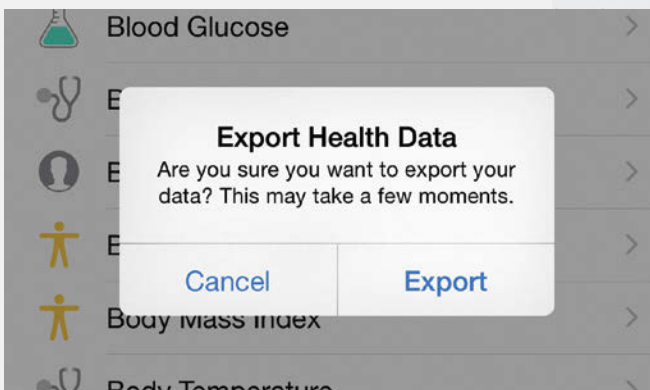
Tap Health Data to see items that can be recorded. They include attributes such as weight; others that your doctor may want to record because of your age, such as blood pressure and heart rate; and yet more that are used to monitor long-term medical conditions, such as blood glucose levels and how often you use an inhaler.



03

MANAGE YOUR DATA

Tap Add to return to the overview of the graph. Tap 'Show All Data' to review everything in numeric form. Data needn't be added manually. Tap 'Health Data > Fitness > Walking + Running Distance' (or Flights Climbed) to see data captured by your iPhone's sensors. Data can be removed by tapping 'Show All Data' and swiping left on an item, then tapping Delete, or by tapping Edit then Clear All.



05

EXPORT HEALTH DATA

Data can be emailed by tapping 'Health Data > All > Share' (top right).

The archive this creates contains two files structured in a way that isn't easy to read without specially-designed software. As Health becomes more widely used, expect more professionals to provide ways to use this data. For now, Health is more useful as a way to review your progress with a professional in person.

Cancel

Add Data

Add

Date

6 October 2014

Time

07:00

g

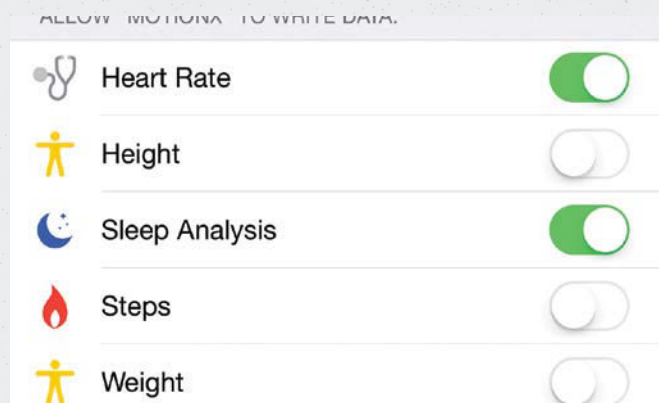
45

02

RECORD SOME DATA

Tap an item to track and you'll see a graph that's empty for now. Below that, 'Add Data Point' enables you to manually record a reading.

Depending on the item type, the form for doing this may indicate an expected scale. The time and date are automatically set to when you're adding the information, but this can be overridden in the event that you couldn't add a reading when it was taken.



04

OTHER DATA SOURCES

Other apps can supply data; they may use your iPhone's GPS to track, say, cycling distance, or connect to a Bluetooth accessory to track exercise, heart rate, etc. Apps ask permission to provide data; you can review these — and which items each can update — by tapping Sources. Permissions can be rescinded in 'Settings > Privacy > Health', and Motion Activity and Location Services there.

THE DASHBOARD

Some fitness apps receive data from other hardware, which connects to your iPhone using Bluetooth. The Health Mate app from Withings receives data from the company's products, such as its Smart Body Analyser, and feeds this into the corresponding items in Health. You may have a blood pressure monitor from one company and a wearable band to track exercise or sleep patterns from another, and use the sensors in your iPhone to track findings from both. The data can be collated in Health's Dashboard, which provides a single place to monitor a multitude of attributes and activity. ■



[DOWNLOADS AND STREAMING]

Improving BitTorrent speeds over a VPN

THERE ARE A HANDFUL OF WAYS TO GUARANTEE THAT YOUR BITTORRENT DOWNLOADS ARE ANONYMOUS.

[NATHAN TAYLOR]

THE MOST COMMON way to make sure your downloads are anonymous is to use a VPN service, which, when switched on, routes all your traffic through a VPN service provider, effectively anonymising your IP address. For BitTorrent, however, that can mean a big hit to performance. Depending on your VPN provider, you can get as little as 10% of your regular connection speed when downloading over the VPN.

If you have a bad VPN provider, there's not much you can do about this except get one that performs better. Often, however, there are simple configuration tricks that can speed up a connection.

SWITCHING LOCATIONS

The first thing you can try is switching VPN locations. Most VPNs give you a choice of server, which is used to bypass content geo-blocks, but is largely irrelevant in terms of BitTorrent anonymity. For example, there's no difference in anonymity between choosing an Australian VPN location and a US, Canadian, Asian or European one. They all obscure your IP address just the same.

Finding out which one works best is often a case of trial and error. Start with local servers, but try others as well. Depending on how much bandwidth the VPN provider allocates to each and the user load, you may get best results from some obscure locations. You may find Korean, Japanese, Canadian or northern European servers work best (since those countries have small populations but excellent internet connectivity).

PORT FORWARDING AND P2P SERVERS

This one can be a little tricky and varies from VPN provider to VPN provider, but we've found excellent results. On Private Internet Access (PIA), for example, we went from ~300KB/s downloads to over ~1MB/s by switching on port forwarding and using a Canadian server in lieu of a US one.

On PIA, the method is pretty simple. Head into the VPN settings and click on Advanced. Check the box that says port forwarding. Then

click on save and reconnect to the VPN. Then mouse over the TaskBar icon to see the port number. Open up µTorrent and open Preferences. Head to the Connection section and uncheck the Randomize Port option. Then enter the port number from PIA into the incoming connection port field.

But that's just one VPN provider. Others work a little differently. AirVPN allows you to manually configure ports to be forwarded using the web interface on its web site. So you forward a port (choose any number over 13,000), and use that number in your BitTorrent client. ibVPN has specific servers for P2P, and you can set any port number over 13,000. Many providers support UPnP, so as long as Enable UPnP Port Mapping is switched on, you should be good. The best solution is to check with your VPN provider on how and if to forward ports.

THE SOCKS5 PROXY

Before VPNs came along, SOCKS5 proxies were the way to anonymise BitTorrent. Services like BTGuard offered special SOCKS5 accounts for BitTorrent downloaders. BTGuard still does, and several VPN service providers (including PIA) still offer special SOCKS5 capabilities.

Connect It may take a while to try them all out.

Disconnect

Connect Auto

Connect US California

Connect US East

Connect US Midwest

Connect US Texas

Connect US Florida

Connect US Seattle

Connect US West

Connect US Silicon Valley

Connect UK London

Connect UK Southampton

Connect CA Toronto

Connect CA North York

Connect AU Sydney

Connect AU Melbourne

Connect Netherlands

Connect Switzerland

Connect Sweden

Connect France

Connect Germany

Connect Russia

Connect Romania

Connect Turkey

Connect Hong Kong

Connect Singapore

Connect Japan

Connect Israel

Connect Mexico

Settings

Exit

General
UI Settings
Directories
Connection
Bandwidth
BitTorrent
Transfer Cap
Queueing
Scheduler
Web UI
Playback
Advanced

Connection

Listening Port

Port used for incoming connections: Random port

☒ Enable UPnP port mapping ☐ Randomize port each start

☒ Enable NAT-PMP port mapping ☒ Add Windows Firewall exception

Proxy Server

Type: (none) Proxy: Port:

☒ Authentication Username: Password:

☒ Use proxy for hostname lookups

☒ Use proxy for peer-to-peer connections

Proxy Privacy

☒ Disable all local DNS lookups

☒ Disable features that leak identifying information

☒ Disable connections unsupported by the proxy

Setting the port number in µTorrent.
OK
Cancel
Apply

“BITTORRENT ITSELF INCLUDES OPTIONAL ENCRYPTION, SO IT’S PRETTY SAFE TO USE, AS LONG AS IT’S CONFIGURED CORRECTLY.”

SOCKS5 (Socket Secure version 5) works kind of like a VPN service for a specific application (in this case, BitTorrent) allowing traffic to be routed through an anonymising proxy. Unlike a VPN, it’s not natively encrypted, so in theory an agent (like an ISP) could intercept and analyse data en-route. That’s not likely, however, and BitTorrent itself includes optional encryption, so it’s pretty safe to use, as long as it’s configured correctly. Just as importantly for our purposes here, you’ll often find it faster than using the full VPN service.

To set up a SOCKS5 proxy, you need:

- ★ A proxy server address and port number.
- ★ A username and password.

Both of these will be provided by your VPN/SOCKS5 service provider. In some cases (such as with PIA), the username and password might be different from your VPN service username and password. Check with your provider.

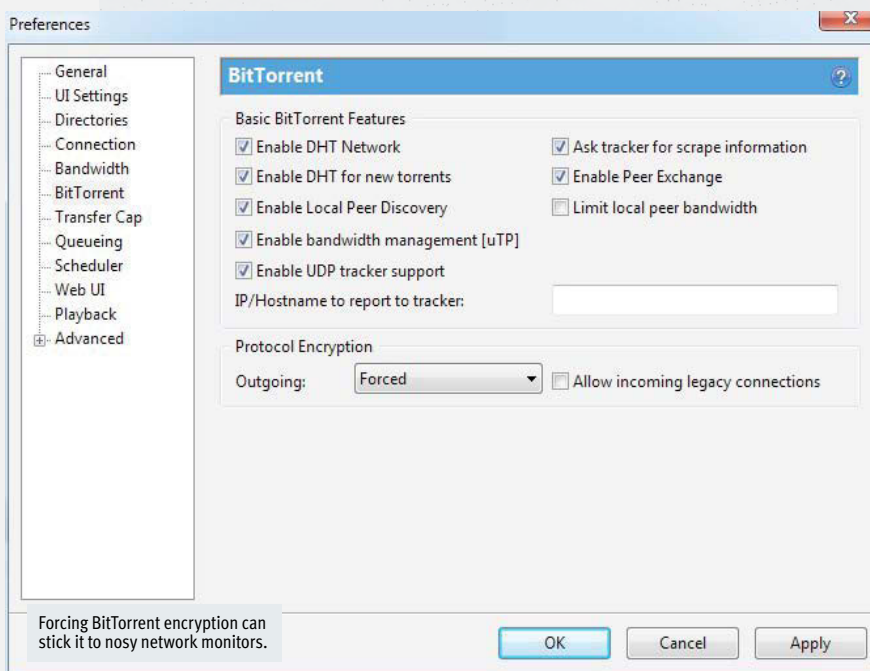
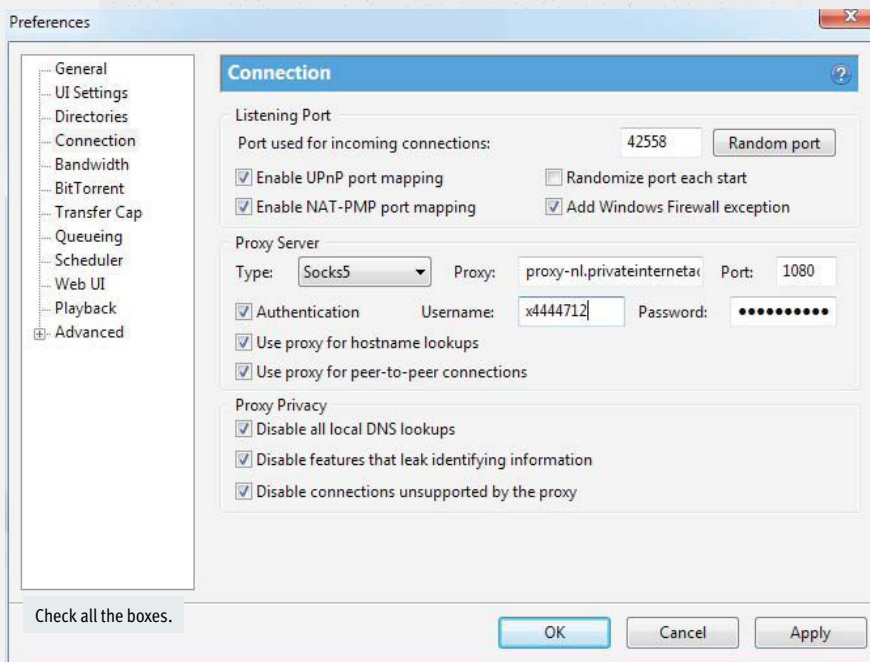
Once you have these details, open up µTorrent and click on the gear icon to open up your preferences. Click on Connection, and where it says Proxy Server, change it from none to SOCKS5.

In the Proxy: field enter the server address, and the port number next to it. Check on the Authentication box, then enter your username and password.

Below that, there’s a box called Proxy Privacy. Check all three of these boxes. This is very important — without them, SOCKS5 has the possibility of “leaking” by using default (non-secure) DNS servers and sending identifying packets that could potentially be used to track you.

We’re not quite done. Click on BitTorrent on the left side of the preferences window. Under Protocol Encryption, make sure that Outgoing: is set to Force. Then uncheck the box that allows incoming legacy (unencrypted) connections.

Protocol encryption ensures end-to-end encryption of the link between you and other BitTorrent users. The most recent version of it (including the version used by µTorrent) encrypts the entire stream. Remember how we said SOCKS5 could be theoretically monitored by nosy ISPs? With Protocol Encryption forced,



they can’t.

Forcing it can have some drawbacks. Essentially, your BitTorrent client will refuse to talk to other BitTorrent clients that don’t have it enabled, which could potentially slow your downloads. If you’re finding that’s the case, you can change it to enabled (and allow legacy connections) — it’s not as secure, but in reality your ISP is not all that likely to be complicit in BitTorrent monitoring for now.

Remember to disable your VPN, then give downloading a whirl. Hopefully it will be faster than using the full VPN service.

CHANGE VPN PROVIDERS

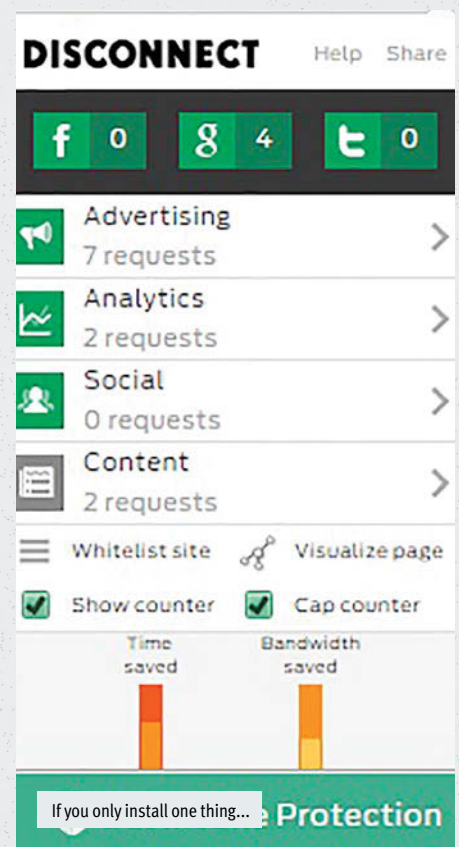
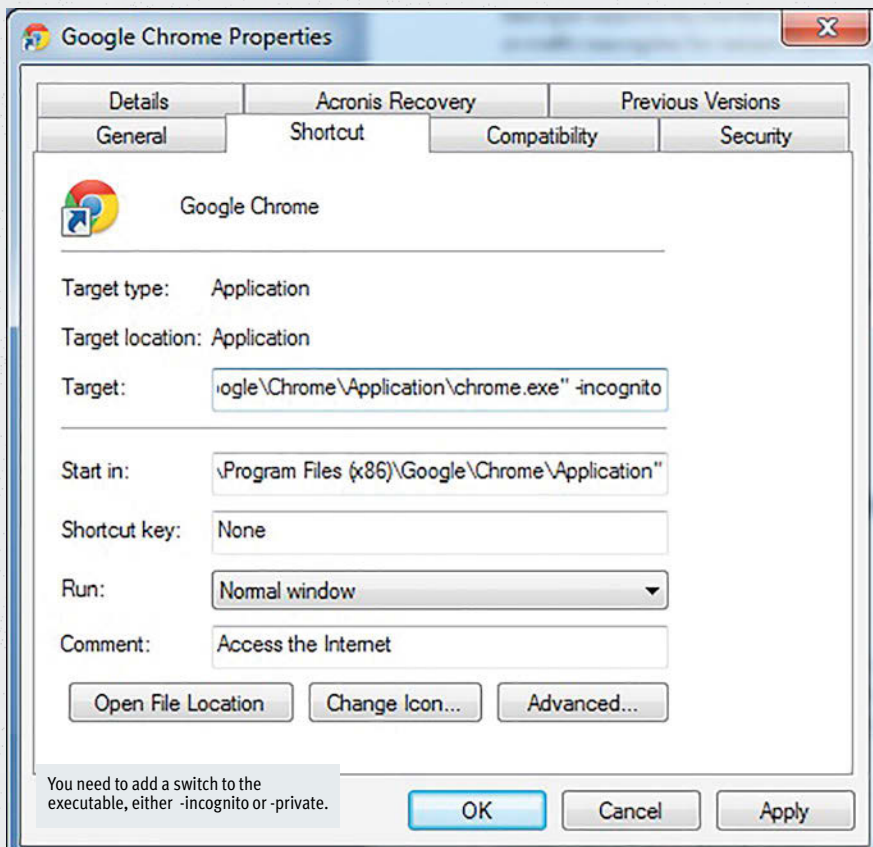
Obviously this is a drastic step, but if all the VPN locations are kind of sucky and port forwarding or switching to SOCKS5 still doesn’t work, you can always try other VPN providers. Many have free trials or money-back guarantees (although getting your money back may require some patience) so there’s no real harm in playing the field. It’s often the case that you get what you pay for, and you may find that the super-cheap VPN provider you went for originally doesn’t have the service levels you need. ■

[PRIVACY & SECURITY]

Hardening your web browser

BECAUSE A VPN ALONE IS NOT ENOUGH TO ENSURE YOUR ONLINE PRIVACY.

[NATHAN TAYLOR]



IF YOU'VE NOODLED around with the anonymising network Tor at all, you'll probably have come across the Tor browser, a specially built version of Firefox with extra security layered in. It's actually a crucial part of the Tor's security, because there's more to protecting yourself than just hiding your IP address.

The same principal applies to VPNs. A VPN provides part of the privacy and security package, but it's not the whole deal. It hides your IP address and encrypts your traffic for part of its journey across the internet — but not the whole way. With a VPN, the connection between you and the VPN provider is encrypted, but the part after that, the connection to the end web site, is not.

Nor does a VPN prevent your computer from transmitting too much information to end web sites, and your browser can very easily leak too much information about you and your activity.

So we're going to look at some of the simple things you can do to stop that — that is, to make your regular browser work more like the Tor

browser. We won't go quite as far as Tor (which disables plug-ins) or recommend doing things like disabling JavaScript, which cripples a lot of web sites. The tips below are going to focus on a few things that you can do without any real impact on how you use the web.

We'll focus primarily on Firefox and Chrome, since frankly IE has fewer tools at its disposal for protecting privacy.

PRIVATE AND INCOGNITO BROWSING, ALWAYS

No cookies, no history.

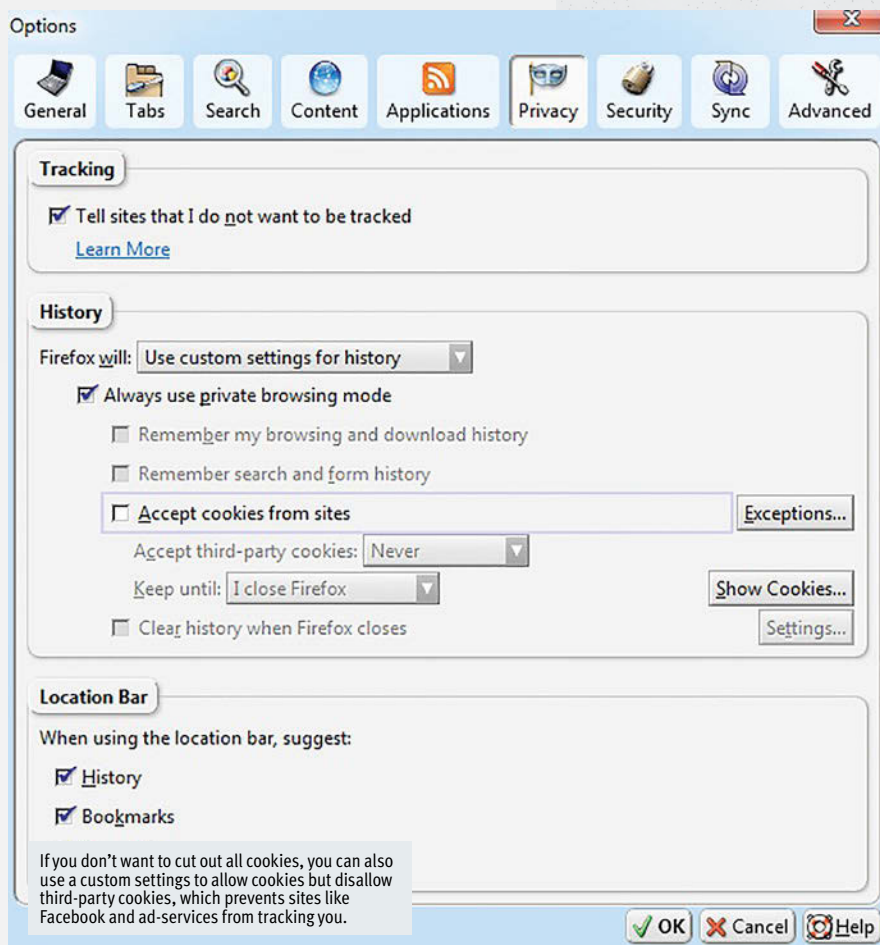
Known as Private Browsing in Firefox and IE and Incognito browsing in Chrome, this is a feature that all the major browsers have built in. In Firefox to bring up a Private Browsing Window press 'Ctrl-Shift-P'; in Chrome, press 'Ctrl-Shift-N'.

Any browsing done in an incognito/private window has a special property: no history is recorded and (more importantly), no browser cookies are kept after a session ends.

Take away cookies, and you take away a lot of power from sites looking to track you through them.

You can set Private/Incognito to be the default in both browsers.

- * In Firefox, click on 'Tools > Option', then click on Privacy. Under the History section, there's a label 'Firefox will:' and a drop-down box. Change the entry in the drop down box to 'Never remember history'. Although it won't have a private mode label, it will use the same settings as Private Browsing.
- * In Chrome and IE, you'll need to add a modifier to the startup link. Find the link you click to start the application (not the one in the Taskbar, but in the Programs menu) and right click on it. Select Properties and you should be taken to the Shortcut properties window. Locate the Target field, where it shows the link to the executable file. For Chrome add -incognito to the end of the line. In IE, add -private.



HTTPS Everywhere

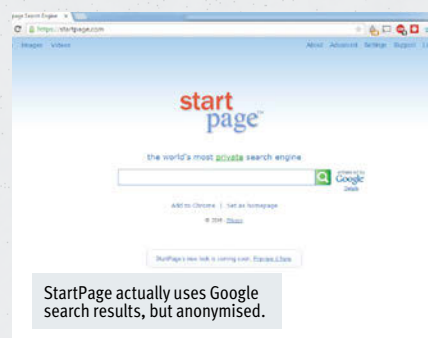
☐ Block all HTTP requests

[Add a rule for this site](#)

[What is this?](#)

(Version: 2015.4.23)

The add-on generally doesn't need to be managed. Just install and forget.



HTTPS EVERYWHERE

End-to-end encryption.

Since a VPN only encrypts your connection between you and the VPN provider, the rest of the journey to the final web site is unencrypted. That's where your data can conceivably be intercepted and read.

Using HTTPS, as opposed to regular HTTP, however, creates an encrypted link between you and the end web site. Nobody can intercept and read messages passed between you and the web site, which is why eCommerce sites use it, for example. The thing is, a lot more sites can use it than actually do by default, which is where HTTPS Everywhere comes in. It attempts to

force sites that support HTTPS to use it.

It's an add-on available for Chrome, Firefox (including Android) and Opera. It really requires nothing from you: just head to www.eff.org/HTTPS-EVERYWHERE and install it for your browser. It adds a widget in your browser bar, but generally works automatically.

REMOVAL OF TRACKING WIDGETS AND ANALYTICS

Disconnecting from web trackers.

We've extolled the virtues of Disconnect (disconnect.me) a number of times in this column, and we're going to do so again. The add-on is available for Firefox, Chrome and

Opera and does an excellent job of excising tracking elements from the pages you visit. Tracking cookies, Facebook/Google/Twitter widgets, ad links and analytics are all removed from the page before they're downloaded.

It's available as a downloaded app, or you can go to the Extensions/Add-ons section for your browser and search for the Add-on.

It certainly has some overlap with HTTPS Everywhere (since it also tries to force HTTPS), but there's no harm in having both installed.

AN INCOGNITO SEARCH ENGINE

Because searches should be private.

Google and Microsoft are rather notorious data gatherers and hoarders. Every search you do is logged and linked to your profile. An anonymous search engine is better. DuckDuckGo (duckduckgo.com) and Startpage (startpage.com) are good choices.

Firefox includes DuckDuckGo as an option where you go to 'Options > Search' and you can set it as you default. In Firefox, Chrome and IE, if you go to StartPage or DuckDuckGo, there's a link on the page that will add it to your list of search engines, and you can make it default in the browser settings. ■

TOR EXIT NODES

The recent NSA leaks point to one way the spy agencies have dealt with IP anonymisers like Tor, and why it's so important to keep your browser secure. Whenever you use Tor to access a regular (non-Tor Hidden Service) web site, it has to transit through what's called an exit node. Regular web sites don't speak "Tor", so there have to be gateways that take traffic from the Tor network and put them on the regular internet. Exit nodes perform that task, decrypting traffic and communicating with regular web sites on behalf of Tor users. Seeing an opportunity, the NSA actually set up and ran a number of exit nodes so they could listen in on traffic leaving the Tor network. Sure, IP addresses were still obscured, but all that data was there to be read as it was decrypted and forwarded on. Of course, HTTPS, defeats that kind of monitoring.

[HOME NETWORKING]

Getting the most out of your NAS

A NETWORK ATTACHED STORAGE DEVICE (NAS) IS ONE OF THOSE APPLIANCES THAT YOU DON'T THINK YOU'LL NEED — UNTIL YOU GET ONE AND REALISE THAT YOU CAN'T LIVE WITHOUT IT.

[NATHAN TAYLOR]

THE CONVENIENCE OF having all of your data and media accessible in one place, on a server that requires no management and little configuration is pretty darn great.

Most people don't make the most of their NASs, however. They use them as essentially basic file and media servers when they can nearly always do so much more. QNAP, Synology and Thecus NASs use Linux-based operating systems and have a tremendous amount of flexibility when it comes to apps and add-ons. Other vendors like D-Link, Western Digital and Seagate also typically come with a heap of add-ons and extras.

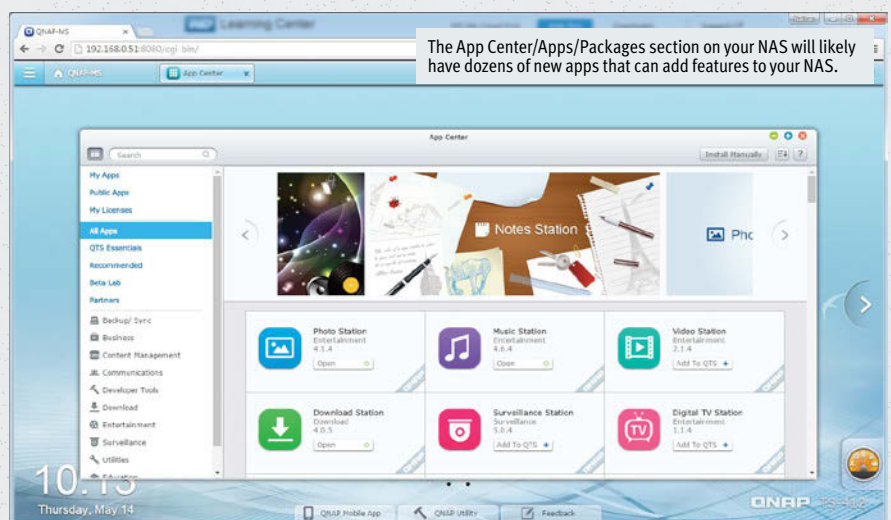
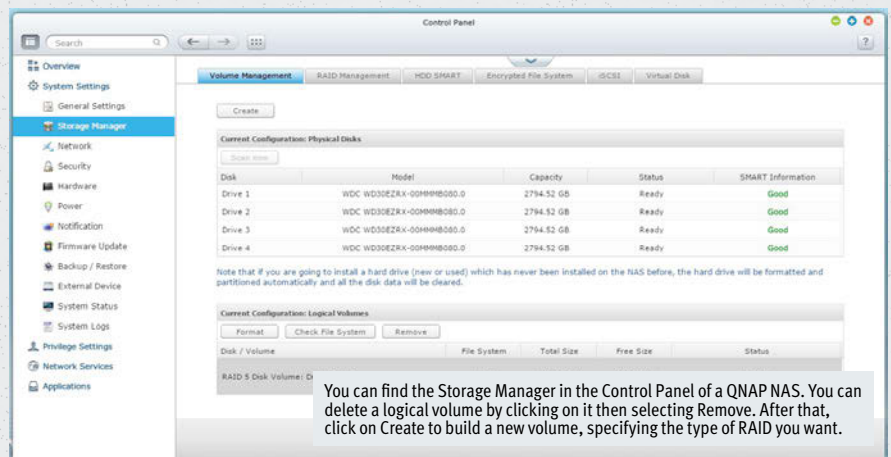
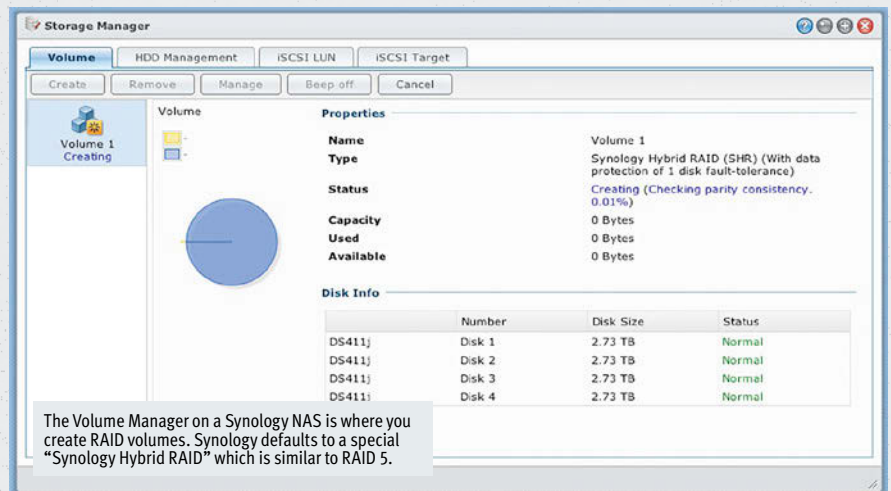
Below we'll look at some of the things you should think about using your NAS for in addition to file serving. We'll start with talking about RAID configurations, which can provide a level of file security that you won't find on a regular PC.

RAID CONFIGURATION

One thing you should definitely think about is configuring your NAS for reliability. NAS do this via a technique called RAID — redundant arrays of inexpensive disks. RAID can be configured to dedicate one or more drives in NAS as parity or mirror drives — you lose that hard drive as a storage device (reducing your overall capacity), but if one of the hard drives in the NAS fails, you won't lose any data — you can simply replace the hard drive. RAID also combines multiple drives into a single “logical” volume — so multiple drives appear to be a single high-capacity drive in use.

On two-drive NASs, RAID 1 (or 0+1) is your best bet. This is known as mirroring. All data is copied to both drives. Yes, you lose half your capacity, but you'll likely never lose data.

On a three-or-more drive NAS, look to RAID 5. This spreads parity information across the



drives such that any one hard drive can fail without losing any data. It costs the capacity of one hard drive. For example, in a four by 4TB drive NAS, you'd only have 12TB capacity.

You can set up RAID during the initial NAS configuration — there's often a wizard that will walk you through the initial drive configuration.

You can also change it later by heading to the

disk/storage/volume manager in the NAS configuration console. Changing it will destroy all the data currently on the NAS, however, so make sure you back up beforehand!

ADDITIONAL APPS

Once you've created a reliable volume, don't stop there. In the control panel of your NAS you'll see a section called Apps, App Center or

Package Center. This is where third party server apps can be found. There are a huge number of apps available — especially on the Linux-based NASs from Synology, Thecus and QNAP. Some of our favourite tools include: cloud backup, downloaders and surveillance.

CLOUD BACKUP

Most of NASs have access to backup solutions, including both local backups (to network shares and attached USB drives) as well as cloud backup solutions.

For example, I'm a big fan of CrashPlan, and on my QNAP NAS it's a downloadable option (it's also available on Thecus, Synology and some WD NASs). It can be a little complex to set up, but it's worth it.

On the QNAP NAS you only get the CrashPlan back-end — there's no interface for controlling it. What you have to do instead is install CrashPlan on your PC, then go to the CrashPlan directory and enter the /conf subdirectory. You then open the ui.properties file in Notepad (or similar text editor), and change the line that says: `#serviceHost=127.0.0.1` to this: `serviceHost=IPaddress`

Where `IPaddress` is the IP address of your NAS (also note the removal of the #). After you do that, your local CrashPlan client will actually be controlling CrashPlan on the NAS, just like you would on the PC. You can set schedules, choose backup directories and set targets just as normal. The NAS can also be set as a CrashPlan backup target for other devices, though if you want devices from outside your network (like the PCs of friends and family) to be able to back up to it, you'll have to set up port forwarding on your router. The port 4242 will have to be forwarded to the NAS IP address (we covered port forwarding in the January issue, and CrashPlan in February).

When you're done configuring the NAS, you can change the line back to `#serviceHost=127.0.0.1` to control the local CrashPlan client again.

DOWNLOADERS

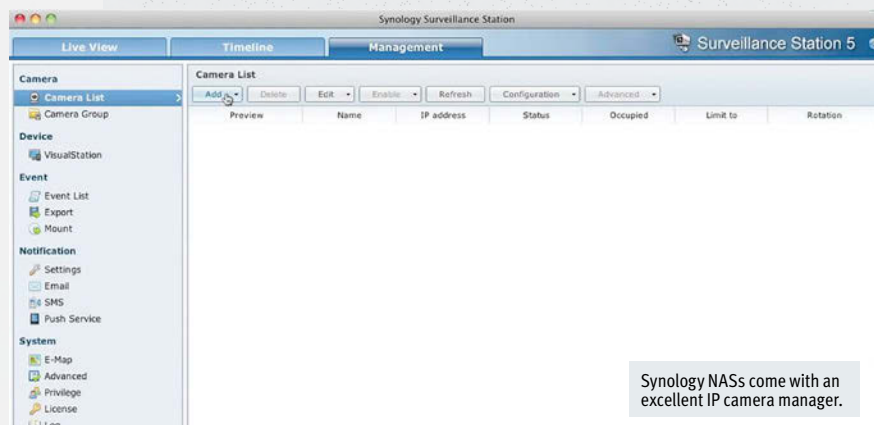
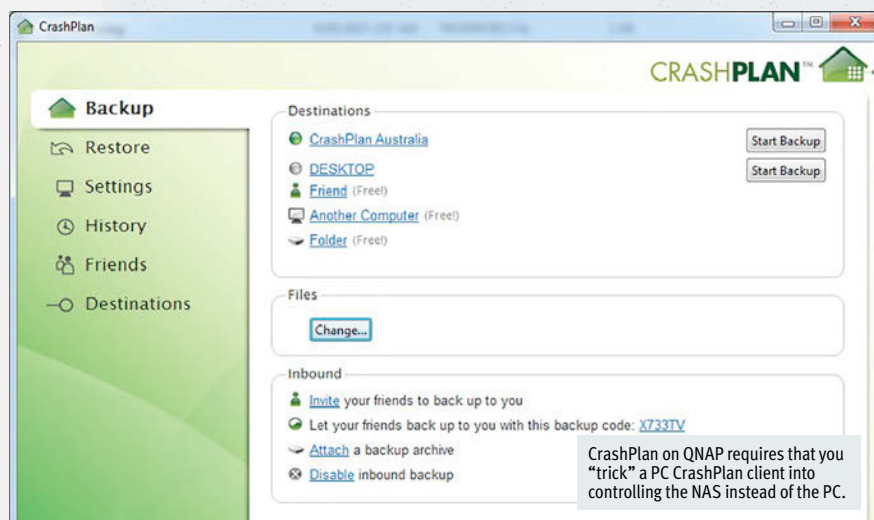
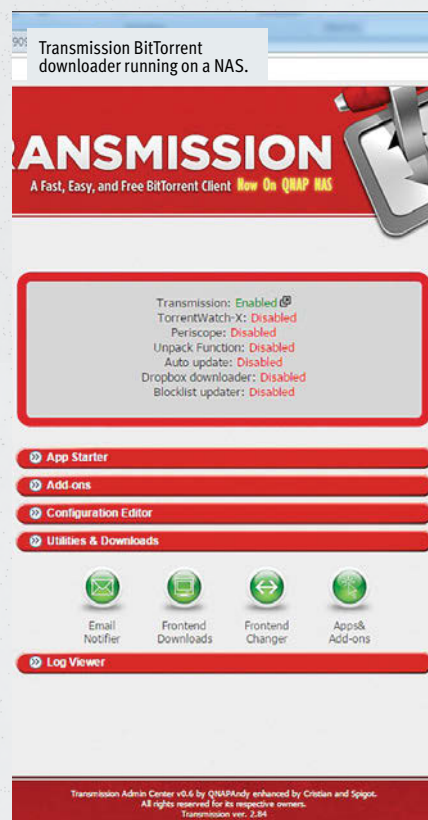
Most NASs have inbuilt BitTorrent clients (along with possibly other peer to peer services supported as well as newsgroups.) Using these saves you from having to worry about leaving your PC on or from copying the files to your NAS after. You can queue new torrents from the web interface — from your mobile or any other device.

Where it's available, your best bet is Transmission, a full-featured BitTorrent client and downloader. From the NAS's App centre, select and install the Transmission client. Then click open — it should open a new tab with the

Transmission Admin Center. Next to the Transmission:Enabled note, there's a little link — click on it to take you to the Transmission Torrent manager — which will require a log in and you should bookmark for future quick access. (If you click on Utilities and Downloads, you can also download a front-end for your PC or mobile, which give you control over the downloader in an app rather than through the web interface).

SURVEILLANCE

NASs make great surveillance stations. They can draw feeds from USB cams or IP cameras and they have plenty of storage on tap to record feeds. Not all NASs support this, but QNAP and Synology have particularly good implementations. On both, you can use QUSBCam to get feeds from USB cameras attached to the NAS, but the real power is found in the Surveillance Station, which lets you add multiple IP cameras, with sophisticated recording options (including motion detection and time) — although multiple camera setups might require additional licensing from the NAS provider. ■





1/640 sec at f/8, ISO 200; +0.33 compensation.

Two different setting combos yield similar overall exposures, but the effect on the clouds is dramatically different.

1/20 sec at f/16, ISO 100.

[PHOTOGRAPHY MASTERCLASS]

Core photography skills: exposure

HOW TO GET PICTURES WITH PUNCH BY BALANCING APERTURE, SHUTTER SPEED AND ISO.

[MARCUS HAWKINS]

WHAT'S THE FIRST THING I NEED TO KNOW ABOUT EXPOSURE?

Exposure — allowing light to hit the camera sensor to record an image — is measured in what's commonly referred to as 'stops', with each stop representing either double or half the level of exposure of the adjacent stop. Increase the exposure by one stop, and the camera sensor receives twice the level of exposure. Decrease it by one stop, and the exposure level is halved.

The three camera settings that give you control over the exposure — aperture, shutter speed and ISO — can each be measured in stops. For instance, a shutter

speed of 1/50 sec is one stop slower than 1/100 sec, which means the sensor is exposed for twice as long. However, the same 1/50 sec shutter speed exposes the sensor for half the time of a shutter speed of 1/25 sec.

ISO is similarly clear-cut, with an ISO of 400 one stop more sensitive than ISO 200, but one stop less sensitive than ISO 800. The relationship between the range of apertures available on a lens is similar, but the numerical sequence is more confusing: the fact that f/5.6 is one stop smaller than f/4 but one stop larger than f/8 takes a bit of getting used to.

SO HOW DO I KNOW WHAT THE CORRECT EXPOSURE IS?

Once you activate the camera meter by half-pressing the shutter release, the camera will suggest an exposure based on the brightness of the area being metered. This is usually expressed in the order of a shutter speed value at a given aperture and ISO — say 1/60 sec at f/8, ISO 200.

In the camera's automatic and scene modes, that's about as far as it goes. Just shoot. The semi-automatic exposure modes — Aperture Priority, Shutter Priority and Program — give you more control over how you expose the shot, each in a different way; while Manual mode

EXPLAINED: THE EXPOSURE TRIANGLE

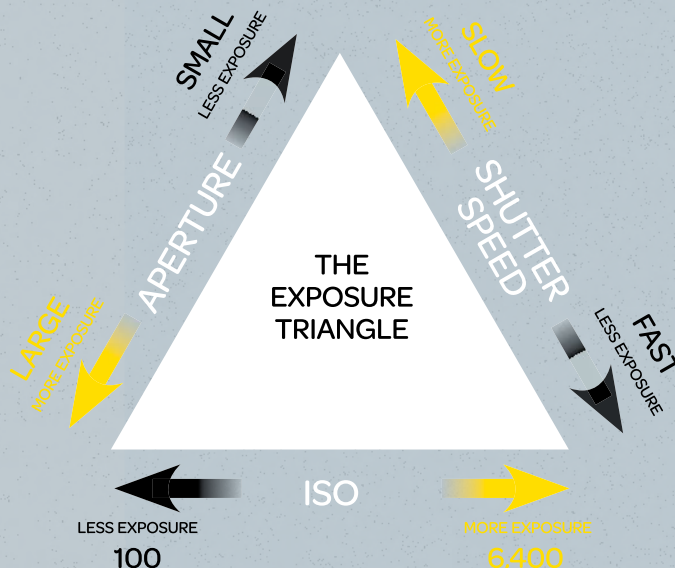
Knowing the effect you want to achieve will determine which exposure setting you need to choose first.

In addition to their role in exposure, the choice of aperture, shutter speed and ISO have a significant impact on the look and feel of your pictures. Aperture, for instance, affects the depth of field, or how much of an image appears sharp. Shutter speed also affects image sharpness, with slower shutter speeds leading to blurred images — whether that's caused by the subject moving or the camera not being held still.

The choice of ISO enables you to use the optimum combination of aperture and shutter speed when the amount of light would normally prevent you from doing so. However, increasing the ISO also reduces the quality of your images.

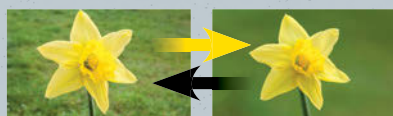
Use the exposure triangle (right) to decide how to adjust the exposure: the key is that when you increase the exposure for one element (a yellow arrow), you need to reduce it for one or both of the other elements (the grey arrows) in order to maintain the same exposure. The camera can do this for you in Program, Aperture Priority or Shutter Priority, but it's something you'll need to consider when shooting in Manual mode.

Get the hang of this relationship, and you'll gain much more control over the look and feel of every image you capture.



APERTURE

f/32 f/22 f/16 f/11 f/8 f/5.6 f/4 f/2.8 f/1.4



Less exposure
Large DoF

More exposure
Shallow DoF

As you adjust the aperture, the depth of field changes, affecting how much of the final shot is in focus.

SHUTTER SPEED

1/2,000 1/1,000 1/500 1/250 1/125 1/60 1/30 1/15 1/8



Less exposure
Frozen motion

More exposure
Blurred motion

Adjusting the shutter speed changes how moving subjects are recorded and affects how camera-shake is recorded.

ISO

100 200 400 800 1,600 3,200 6,400 12,800 26,500



Less exposure
Clean image

More exposure
Noisy image

Adjusting the ISO or light sensitivity affects how much light the sensor needs, but can introduce visual noise.

EXPLAINED: ONE EXPOSURE, THREE WAYS

There are three camera settings that enable you to control the exposure of a picture: aperture, shutter speed and ISO. All three elements need to be balanced

to produce an acceptable exposure. This is where thinking about exposure in terms of stops helps, as you can see in our examples of 'exposure maths'. The three

exposures below would produce three images that have the same level of overall brightness; it's just that each will look slightly different to the others.

APERTURE	SHUTTER	ISO
f/2.8	1/30	3,200
f/4	1/60	1,600
f/5.6	1/125	800
f/8	1/250	400
f/11	1/500	200
f/16	1/1000	100

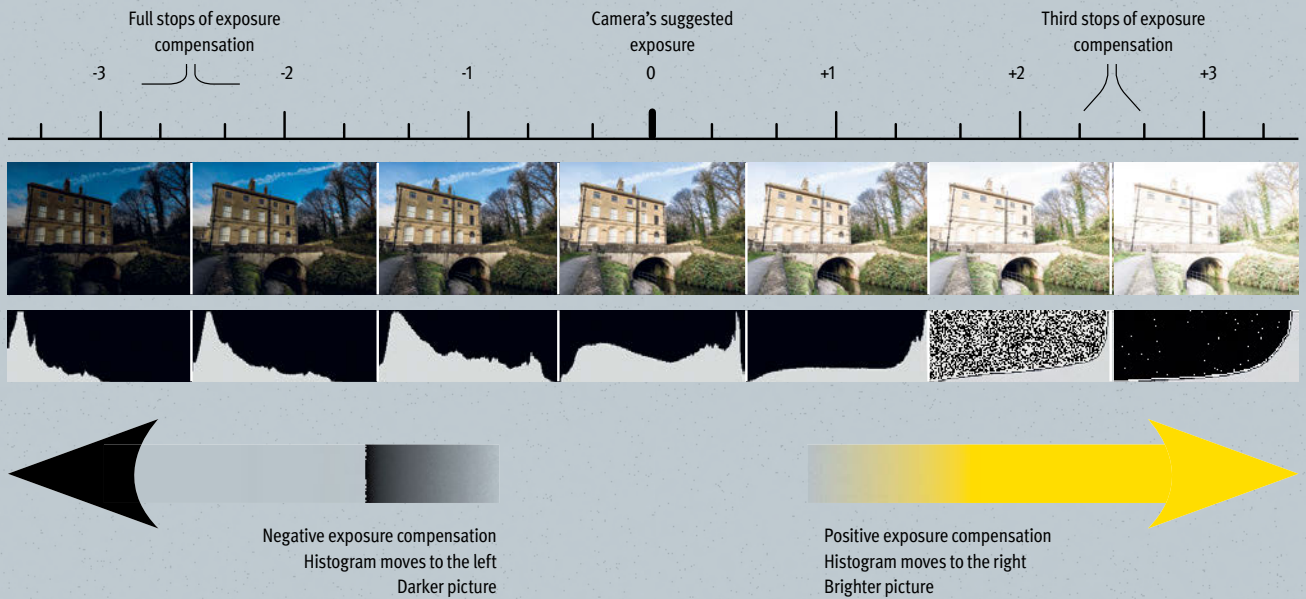
This setting offers a reasonable depth of field with some risk of visual noise.

APERTURE	SHUTTER	ISO
f/2.8	1/30	3,200
f/4	1/60	1,600
f/5.6	1/125	800
f/8	1/250	400
f/11	1/500	200
f/16	1/1000	100

Increasing the aperture to f/4 means the shutter can be open for less time.

APERTURE	SHUTTER	ISO
f/2.8	1/30	3,200
f/4	1/60	1,600
f/5.6	1/125	800
f/8	1/250	400
f/11	1/500	200
f/16	1/1000	100

Alternatively, a slow shutter speed means a smaller aperture is possible.



EXPLAINED: USING EXPOSURE COMPENSATION

Learn how to override the camera meter in order to get better exposures — whatever the conditions.

It's not uncommon for your camera's exposure meter to make mistakes. It's calibrated to produce a balanced exposure, but bright or dark scenes can fool it into dishing up images that are underexposed (too dark) or overexposed (too bright). Your camera's exposure compensation function enables you to rectify this — or simply make a picture a little brighter or darker if that suits the subject or your tastes better.

The exposure setting that is adjusted when you use exposure compensation is determined by the shooting mode the camera is in. In Aperture Priority mode, the aperture that you set remains fixed, so it's the shutter speed that's increased or decreased. In Shutter Priority mode, it's the aperture value that's altered to give a brighter or darker result. The ISO may also be adjusted if you've set it to Auto ISO. In Program mode, the camera will jiggle all three settings to achieve the same effect.

“WHICH COMBINATION YOU CHOOSE IS DOWN TO THE LOOK YOU WANT TO ACHIEVE: DO YOU WANT A LARGE DEPTH OF FIELD OR A SHALLOW ONE? DO YOU WANT MOVING OBJECTS TO BE RAZOR-SHARP OR HAVE MOTION BLUR?”

1/100 - 1/200 - 1/400), which means less light is being captured, the aperture has to increase in size by four stops ($f/16 - f/11 - f/8 - f/5.6 - f/2.8$) to allow more light in — otherwise the picture would be four stops darker.

Which combination you choose is down to the look you want to achieve: do you want a large depth of field or a shallow one? Do you want moving objects to be razor-sharp or have motion blur?

THAT'S A LOT TO THINK ABOUT BEFORE YOU TAKE A PICTURE...

Don't panic! If you choose to shoot in one of the semi-automatic modes, the camera does most of the donkey work for you. Once you set an aperture in Aperture Priority mode, for example, the shutter speed will be set automatically. If you decide to change the aperture, the camera will adjust the shutter speed accordingly to maintain the same exposure.

It's a similar story with Shutter Priority mode: you set the shutter speed, and the camera attempts to match this with an appropriate aperture. You can even use the

Auto ISO option to let the camera handle that choice of sensitivity too. In Program mode, you can simply shift the combination of aperture and shutter speed with a spin of the camera's control dial.

Of course, all of these adjustments rely on the camera having achieved the optimum exposure reading to begin with — and, as we learned last issue, this doesn't always happen. This is where exposure compensation plays a part.

WHEN CAN I USE EXPOSURE COMPENSATION?

Exposure compensation can be applied in Aperture Priority, Shutter Priority or Program mode. It's also measured in stops: the exposure indicator scale you see in the viewfinder or on your camera's rear display has stops clearly marked on it. You can usually increase or decrease the exposure by up to five stops.

You'll see that there are smaller marks on the scale, too. These represent half-stops or third-stops, depending on how your camera is set up. Although exposure can be shifted in full stops, you get much finer control by adjusting the exposure in these smaller increments. ■

gives you full responsibility over aperture, shutter speed and ISO.

Although there might be a preferable exposure, there are a number of ways in which to achieve it. It's all about balance: if you increase one of the three settings that control the exposure (aperture, shutter speed or ISO) then one or both of the other settings have to decrease by an equivalent total to maintain the same overall level of exposure.

For example, an exposure of 1/25 sec at $f/16$, ISO 100 is equivalent to an exposure of 1/400 sec at $f/2.8$, ISO 100. Because the shutter speed has been reduced by four stops (1/25 - 1/50 -

WHAT WOULD STEVE DO?

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Foxtel's IQ3 set top box provides just about every feature a TV junkie could desire.



[HOME AV MASTERCLASS]

Are DVRs still relevant?

DVRs HAVE SHIFTED OVER THE YEARS IN ORDER TO KEEP UP WITH CHANGING VIEWING HABITS, BUT ARE THEY STILL NEEDED IN THE STREAMING AGE?

[SIMON CHESTER]

THERE WAS A time not so long ago, when DVRs — Digital Video Recorders, the digital replacement for VCRs that were also known as PVRs (Personal Video Recorders) — were considered a standard piece of equipment in the home theatre. However, their relevance has slowly been eroding and they are now — more often than not — an extra feature bolted onto general purpose video players.

And I'm cool with that. Ever since pay TV providers started integrating digital recording into their set top boxes, there's been little need for consumers to go and buy their own unit. Indeed, with the latest version of Foxtel's IQ set top box (IQ3), with its ability to — in addition to recording your chosen content — stream the entirety of some series, browse recently aired programs, rent movies and TV shows, offer suggestions based on viewing habits, be controlled from your mobile, and more, there is seemingly no reason for Foxtel subscribers to buy a DVR.

Those jealous of these features, but not interested in subscribing to Foxtel, will be happy to know that many DVRs out there now provide much more than just the ability to record free to air (FTA) TV.

Indeed, companies including Samsung, Panasonic, and others are releasing new digital video recorders that act more like a video hub than just a recorder. With features like internet apps, streaming of your recorded programs to mobile or local devices, playback from USB and network storage, mirroring your mobile device's screen, web-browsing, as well as Blu-ray playback and, of course, recording free-to-air TV, perhaps there is still room in the AV cabinet for one of these units.

RECORDING TV

But let's first talk about that feature that gives these units their name: recording video. Which begs the question: *why* would you want to record things off TV in the age of the internet?

A few reasons: often there's an obscure movie screening on late night TV that you love but that isn't on Netflix or as a torrent; you may want to record your mum on MasterChef (although, in terms of posterity, a DVR isn't the best place to store these things); perhaps you never get around to watching stuff before it's removed from FreeViewPlus (iView and so on); or you just want to skip all the ads.

If any of these reasons appeal to you, let's start examining what you can expect from a current-gen DVR.

As a short primer, you'll see DVRs listed as having a number of tuners built in — these are the number of TV stations that it can record or watch from at once. So, a DVR with a single tuner allows you to record, but not change the channel while it's recording. A DVR with dual tuners allows you to record one channel while watching (or recording) another, and one with three tuners allows you to record two different channels while watching (or recording) another.

Panasonic's flagship DVR + Blu-ray player (the DMR-BWT955GL, RRP \$949) offers a tonne of extra features, including streaming content to and from the internet, a triple tuner, and a 2TB hard drive.



DIY DVR

One potentially cheaper way to roll together all these features into a single box is to build your own, in the form of a home theatre PC (HTPC). You can either build a dedicated box, or more economically, use an old PC or laptop and connect one or more TV tuner cards to watch and record free to air TV (while, in the US, you can also tune into your pay TV subscription, it's not possible to do this in Australia).

One notable advantage of using a HTPC rather than a dedicated DVR box is the flexibility of moving and archiving your recorded content. Moving your content from a standalone unit is usually forbidden, meaning that you'll lose all your recorded content if your DVR dies. However, moving content from your HTPC is as simple as transferring any other file from a computer.

To make a great HTPC, you need to give it a good interface as well as record and playback capabilities. Kodi or Plex are my favourite interfaces for accessing your content on a TV, and you can set up Kodi to work with your TV Tuner software by following the guide at kodi.wiki/view/PVR.

Note how I said 'to work with your TV tuner software'; Kodi can't control or tune into your HTPC's TV Tuner directly — it only interacts with specific TV control software, including the popular Linux-based MythTV or Tvheadend. In fact, if you're looking for a relatively easy Linux distribution to run on your HTPC, I'd recommend the free Mythbuntu (www.mythbuntu.org), which will get your HTPC up and running with Myth, and allow you to access the TV streams from any Kodi device in the house (bringing live TV and recorded content to a Raspberry Pi or laptop, for instance), much like HDHomeRun would. Indeed, the HDHomeRun Connect is also compatible with Kodi and MythTV (among others), so that could be a good starting point.

If you're more of the Windows variety, then you can use Windows Media Centre (as included with Windows 7 Home Premium, Professional, and Ultimate, or as an optional upgrade in Windows 8 from windows.microsoft.com/en-au/windows/products/windows-media-center/get-it), to control your TV Tuners, as well as playback all of your existing media, from an interface designed for navigation on TVs using a handheld remote control (either your TV's remote using HDMI CEC, or one controlling your PC via a USB infrared port). Another Windows option worth investigating is NextPVR.



There's a surprising variety of PVR software for PCs available.



The awkwardly named 'Leadtek WinFast DTV Dongle Dual' offers a small USB dual tuner for around \$50.

For those with desktop PCs, there are also internal TV Tuners available, such as this Leadtek WinFast DTV2000DS Plus dual tuner for around \$70.



Home theatre PCs — complete with DVR capabilities — can be housed in cases that make them look the part in your AV cabinet, such as this Streamcom FC50D.



Samsung's \$499 Series 8 Blu-ray Recorder, the H8500A, offers many net-connected features, a dual tuner, and a 500GB HDD.



IceTV's Skippa is a DVR that automatically detects ads during your recorded content and skips them during playback.

However, there is a further complication here that is worthy of explanation: subchannels. In order for a network to get more content (and therefore advertisements) out onto their allocated radio frequency, it's become common practice for broadcasters the world over to create 'subchannels' that pack several TV channels into the bandwidth allocated for one (this is done by compressing the signals and multiplexing them to broadcast together — which is why there is only limited HD broadcasts over the air; they just won't fit). Pretty much every 'extra' channel that has been launched by a network in Australia — such as 7mate, GEM, One and so on — is actually a subchannel.

What this means for DVRs is that you can record all of a station's subchannels using only a single tuner. This gives you a theoretical maximum recording capability of eight different programs using only a dual tuner device, as there are as many as four subchannels

on a single DTV channel. In most use cases, though, you're not going to be wanting to record programs exclusively on a single network, so a dual tuner device only *reliably* allows you to record two programs at once, so don't fall for the marketing hyperbole.

STREAMING VIDEO

Another feature that's becoming standard on DVRs is the addition of HbbTV (Hybrid Broadcast Broadband TV aka 'FreeViewPlus' in Australia), which sucks down content via your broadband connection as well as from normal DTV broadcasts. It basically rolls all the 'catch up' services together into a unified Electronic Program Guide (EPG) — which is very handy when you're searching for a specific show but can't remember what network it aired on, or are browsing for content of a chosen genre.

Of course, FreeViewPlus isn't the only net-enabled function seen in DVRs these days: many of them also plug into streaming services (Netflix is the most common, but there are also some IPTV providers), or allow you to create your own by sending your recorded content to your mobile device.

Indeed, the existence of Netflix calls into question the worth of recording *anything*, but as

"THE EXISTENCE OF NETFLIX CALLS INTO QUESTION THE WORTH OF RECORDING ANYTHING, BUT AS ANY NETFLIX SUBSCRIBER KNOWS, THE EXTENT OF THEIR CONTENT IS NOT YET EXHAUSTIVE."

any Netflix subscriber knows, the extent of their content is not yet exhaustive — as mentioned earlier, sometimes the only way to get a copy of a movie is to wait for it to air on late-night TV.

SPECIAL FUNCTIONS

There are also DVRs available on the market that offer several specialty features, such as automatically removing ads, sharing your recorded content around the house or to your mobile, or tapping into IPTV sources.

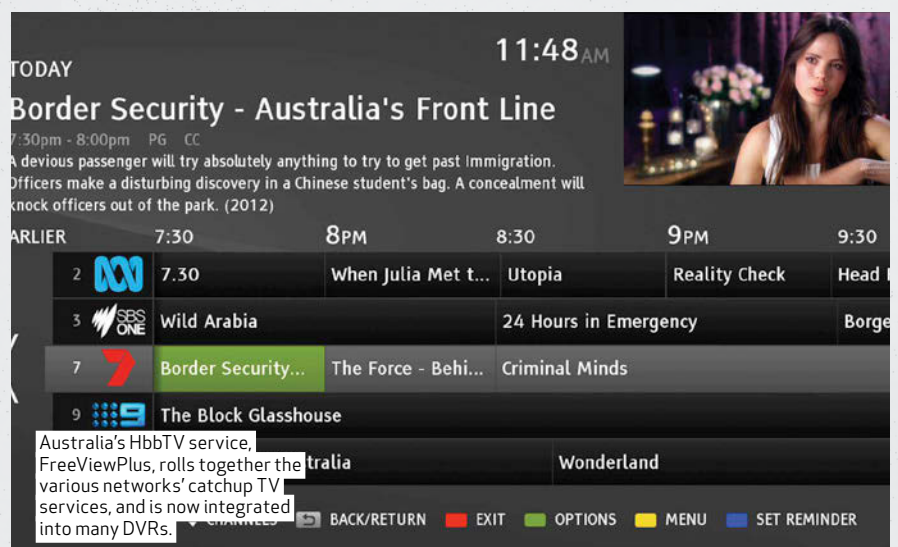
The one you've probably heard of is Telstra's T-Box, which is a DVR that additionally gives you (paid) access to some Foxtel channels through the Foxtel Play service. A similar service is provided by Fetch TV, which is offered as a package with a DVR from several popular ISPs, or purchased outright (with an additional subscription service) from Harvey Norman,

NETFLIX CATALOGUE

While Netflix promises on-tap consumption of movies and TV shows, the reality is that its catalogue — especially in Australia — is far from comprehensive. If you're not yet a Netflix subscriber, but are curious to see what is available on it, you can browse and search for titles at au.allflicks.net.

If you're curious to see how the Australian and US catalogues differ, you can change the catalogue at the site above, or else view a list of the most popular content on Netflix (as ranked by IMDB), and see if it's available here or not, at www.finder.com.au/netflix-australia-vs-netflix-us-tv-shows.

I should also mention that it is possible to access that juicy US catalogue by subscribing to region changing services such as www.getflix.com.au, www.unblock-us.com, or www.unotelty.com. Note that any 'unmetered content' promises from your ISP won't work with a foreign catalogue, though, and setting them up to work on standalone units may be a little trickier.



ALL CHANNELS

7:47 PM

TODAY	7:30PM	8PM	8:30PM	9PM	9:30PM
105 AFRICA	Project Runway	Million Dollar Listing NY		Sex & the City	
106 RENOVATION	Bargain Hunt	Selling Houses Australia...	River Cottage Australia...	Restoration Man	Es
107 7	Border Security: Austr...	The Force - Behind th...	Criminal Minds		M
108 FOX8	Modern Family (S10)	The Vampire Diaries		Falling Skies (S4)	
110 ten	The Bachelor Australia		Wonderland		Ex
111 11	Malcolm in the Middle	That '70s Show	Rules of Engagement	The new Adventures...	Fr
112 9	Law & Order: SVU		Law & Order: Criminal Intent		Ca
113 FOX	Hogan's Heroes	M*A*S*H	As Time Goes By	Basic Instinct	
114 SoHo	Necessary Roughness		Wentworth		O
		Girls	Game of Thrones S4		R

EARLIER

Foxtel's IQ3 set top box includes an updated interface, as well as the ability to view previously aired programs.

FOXTEL

HELP STATION
ARE DVRs STILL RELEVANT?

Domayne, and Joyce Mayne. The subscription service gets you tiered access to different TV channels (a similar selection to Foxtel Play), but you can use the box without a monthly fee as a DVR and Netflix/web-app streamer.

Another specialty DVR is the 'Skipka' offered by IceTV, which launched in May this year. The Skipka — as the name implies — has some built-in smarts that will automatically skip any ad breaks during your recorded content. As mentioned, it uses IceTV's constantly updated (but subscriber only) EPG and smart recording app to make sure that your recordings are made accurately, no matter if their time slot changes. The app (Android, iOS, and Windows Phone) allows you to set series or one off recording events from your phone, no matter where in the (internet connected) world you are.

Also worth considering is the HDHomeRun DVR or HDHomeRun Connect. The DVR is a specialty DVR that had a Kickstarter Project earlier this year (retail prices were not available at time of writing), while the Connect launches in Australia in June 2015 (around \$220). What HDHomeRun does differently is that it shares

If you have a PlayTV for your PS3 laying around, or can source a cheap one on eBay, they work a treat as a USB TV Tuner.



TV across the house using IP — that is, your home network — which means you only require a single aerial, and it allows you to watch Live (or recorded) TV on your computers, consoles, or mobile devices. Admittedly, this is handier in the US where you are allowed to use third-party cable receivers (one of which HDHomeRun also offers as a way to share pay TV around the house), but it's still an interesting product.

You plug the HDHomeRun Connect into your aerial socket and home network (a wired network connection if you want HD), and it'll then give you a DLNA/UPnP compatible stream to connect to. If you have a HTPC or use DVR software such as Windows Media Center,

SiliconDust's HDHomeRun Connect shares your free-to-air TV across your house using your home network, or stores it on a compatible server.



Elgato EyeTV or Myth TV, then you can even control the stream from there. The DVR expands on this further and allows you to record TV to a NAS (network attached storage) device or to your PC using the HDHomeRun software. It's sort of like a no-fuss alternative to setting up your own HTPC.

FINAL THOUGHT

With the all the extras now tacked on to DVRs — such as Blu-ray, DVD, USB, and network playback, web apps, and remote streaming — DVRs have kept up with changed TV viewing habits by morphing from a single purpose device, to more of a media hub. However, most of the extra features seen in current-gen DVRs are also available on cheaper Blu-ray players that forego the inclusion of a DVR. It's up to you, as a TV consumer, to decide if the premium price of DVR capabilities is worth increase in purchase price. And, if you subscribe to Foxtel and have IQ3, it probably isn't. ■

WHAT'S IPTV, ANYWAY?

IPTV is basically a form of pay TV that is delivered over the internet (IP), rather than cable. The biggest providers in Australia are FetchTV (a compatible set-top box is usually sold via your ISP, but boxes are also available outright), and Foxtel Play (which is basically a cable subscription without the cable — it's the same service sold through Telstra's T-Box).

Reports are the Apple Watch costs just US\$83.70 to make.



[TECH FRONTIER MASTERCLASS]

How smart watches work

THE APPLE WATCH HAS ARRIVED, BUT IT'S ONLY ONE OF DOZENS OF SMART WATCHES NOW AVAILABLE.

[DARREN YATES]

AFTER ONE OF the more drawn-out Apple product launches we've seen, the Apple Watch has finally arrived. But the requirement to have at least an iPhone 5 smartphone to pair it with in order to gain full functionality will no doubt spoil the game for some. Still, there'll be no shortage of takers as the Cupertino giant aims to stamp its authority on the fledgling watch market. However, as we'll see, the wider wearables economy is only just getting started.

INSIDE APPLE WATCH

Apple announced to the world last September that its Watch would feature a new sealed 'system in a chip' (SiC) design called the S1. However, market analysts ABI Research

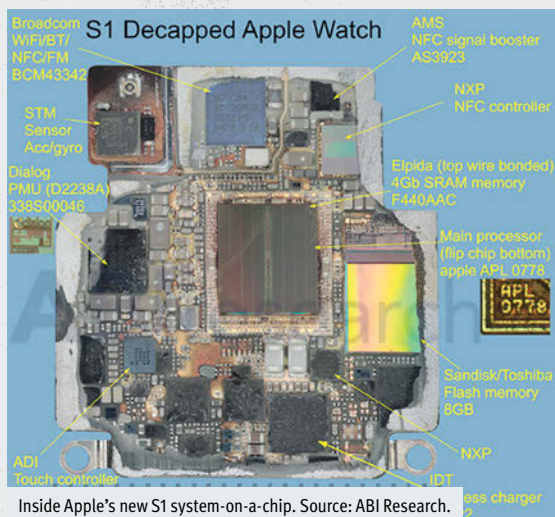
recently ripped the top off the S1 to take a peek at just what's going on inside (tinyurl.com/m2vteyb).

Somewhat surprisingly, the insides looks more like a conventional electronic circuit board, filled with function-specific chips from third-party vendors. The key component is a new Apple ARM-class processor called the APL0778, but that's reportedly coupled with 8GB of flash storage from Sandisk/Toshiba, plus 512MB of DDR memory from RAM brand Elpida. Basic wireless tech (802.11n Wi-Fi and Bluetooth 4.0) comes from Broadcom's BCM43342 chip, there's also an accelerometer/gyroscope sensor chip from STMicroelectronics, plus a couple of other

chips from NXP Semiconductor.

At this stage, little is known about that APL0778 processor, but you can get an idea of its power consumption from the recent teardown performed by the team at iFixit (tinyurl.com/pn2h3dr). The iFixit engineers found a 3.8V/205mAh Lithium-ion battery, which takes up close to half the available real-estate inside the Watch casing and which Apple rates to 18 hours of runtime. By comparison, the iPad Air 2 has a battery with around 8650mAh capacity. The Watch battery is also smaller than the 300mAh battery powering the Moto 360.

So how much does it cost to make an Apple Watch? While Apple will no doubt dispute the



Inside Apple's new S1 system-on-a-chip. Source: ABI Research.



Australia's CSIRO has developed a bendable battery for wearable devices.



Fitbit Charge appears it will have competition from Chinese alternatives.

The new TW64 fitness band sells on eBay for just US\$15.



LG's new stylish Watch Urbane has Wi-Fi for the new Android Wear update.

figures, market analysts IHS recently came up with some numbers — US\$83.70, including US\$2.50 in manufacturing costs (tinyurl.com/nejxfcr). Given Apple sells the base-model 38mm Sport for US\$349, that's a decent profit, if those cost figures are correct. However, IHS says its numbers don't include inherit setup costs such as R&D, intellectual property licensing or logistics.

While Apple, at time of writing, had yet to outline how many Watches had so far been sold, market analysts KGI Securities

believe as many as 2.3 million were snapped up in the first week (tinyurl.com/nlj87ww), likely putting it in pole-position on the wearables leaderboard. Another forecaster, CCS Insight, reckons Apple could ship as many as 20 million watches by the end of 2015 (tinyurl.com/qd6svu8), while 32 million by year's end has even been suggested.

ANDROID WEAR TO GET WI-FI

Having Wi-Fi has been seen as one of the differentiators between the Apple Watch and devices powered by the Android Wear OS from archrival Google. However, Google is fighting back with news announced the week of the Apple Watch launch that an upcoming Lollipop/5.1 update for the wearable platform will deliver the ability to link Android watches to Wi-Fi networks for the first time. That's really interesting, because it means the

limitation of wireless functionality to Bluetooth only in these devices has been software rather than hardware-related in many cases. It's been reported that Motorola's Moto 360, Sony's SmartWatch 3, Samsung's Gear Live and the sleek-looking LG Watch Urbane already have Wi-Fi hardware on-board that should get activated once the new OS update appears. However, more curiously, ASUS's

“IT'S BEEN REPORTED THAT MOTOROLA'S MOTO 360, SONY'S SMARTWATCH 3, SAMSUNG'S GEAR LIVE AND THE SLEEK-LOOKING LG WATCH URBANE ALREADY HAVE WI-FI HARDWARE ON-BOARD THAT SHOULD GET ACTIVATED ONCE THE NEW OS UPDATE APPEARS.”

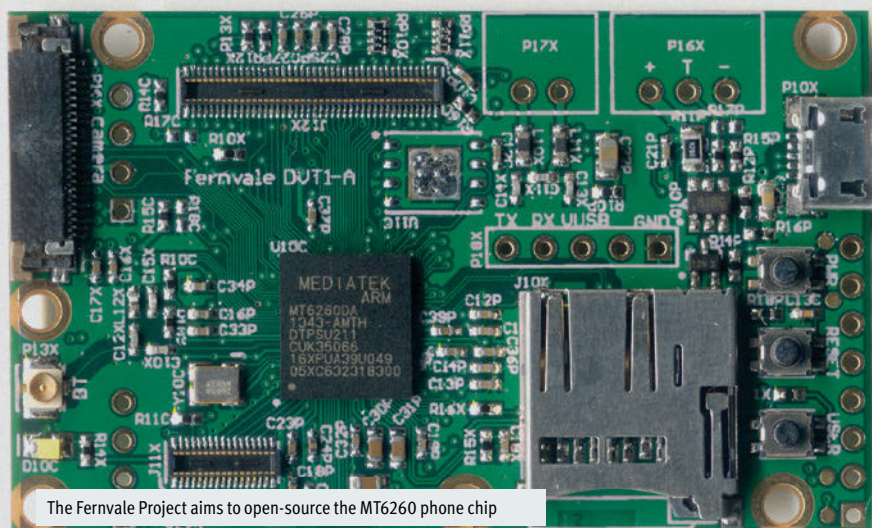
ZenWatch and early LG G Watch series models do not (tinyurl.com/pou7mfj).

There's been no official reason as to why Android Wear left out the Wi-Fi code or why some watch makers chose to include Wi-Fi hardware (even though the OS loaded onto the devices at the time couldn't use it) and some didn't. The ability to now receive notifications via Wi-Fi removes the need for an active smartphone near-by, although, it remains to be seen what effect having Wi-Fi activated will have on device battery life.

At time of writing, there was no official word on when the update would arrive to device users, but it looks to be one well worth keeping an eye out for.

TRADITIONALS EMBRACE TECH

While much of the wearables market is dominated by the likes of Apple and Google, traditional watchmakers are not standing idly by. The luxury watch market is about to join the fray with news that Swiss giant Tag Heuer has inked a deal with Google and chipmaker Intel to create a new smartwatch (tinyurl.com/ng8a5h7). While no-one has sighted the watch yet, or even its name, rumours are already



The Fernvale Project aims to open-source the MT6260 phone chip



The Apple Watch is powered by a new System-on-a-Chip called the Apple S1.



This sub-US\$50 ZGPAX S28 watch doubles as a quad-band GSM phone.



The US\$25 U80 smartwatch has Bluetooth notification for Android phones.



Word is the Moto 360 will have Wi-Fi activated by the Android Wear update.

swirling that we should expect a November launch this year and a price tag of US\$1,400.

The internals of the watch haven't been released but it is known to be running an Intel system-on-a-chip (SoC) and Android Wear OS. Intel's contribution could be either it's popular Atom-class CPU or an updated version of the lesser-known Quark x86 CPU, earlier demonstrated in the Intel Galileo boards. The watch itself is rumoured to be based on the US\$1,500 Tag Heuer Carrera design.

MICROCONTROLLER OR MICROPROCESSOR?

When it comes to the brains inside smartwatches and fitness bands, you'll hear two terms thrown about, often interchangeably — microprocessor and microcontroller. Depending on the model you buy, you'll have one or the other, possibly both — but they're not the same thing.

A microprocessor is another name for the 'central processing unit' or CPU you'll find in your laptop, PC or smartphone. Microprocessors typically have clock speeds of above 500MHz but rely on external chips to supply memory (RAM) and long-term (flash) storage. Microprocessors can handle many different applications at once and are usually controlled by an operating system, such as Windows or Android.

A microcontroller unit (MCU), on the other hand, is quite different — it usually has a clock speed of less than 100MHz (0.1GHz) but carries its own internal RAM and flash storage for storing programs. This on-board storage is also quite minimal — at most you're likely to get no more than 1MB of flash and RAM combined. However, unlike a microprocessor, a microcontroller doesn't require an operating system. When you program an MCU, you're coding the device itself, sometimes described as 'bare-metal programming', for a single

function. Microcontrollers are generally used in what are known as 'embedded' applications, built into everything from cars to washing machines and fitness bands. But as we've seen, they also make it inside phones and watches, handling specific peripheral functions.

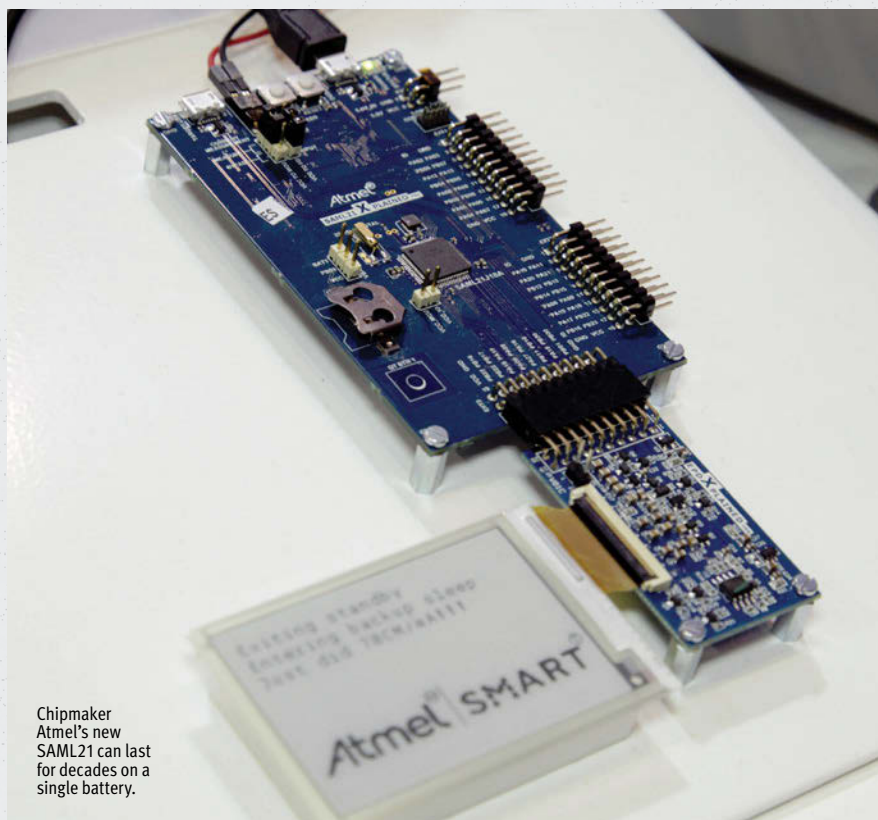
Basically, anything with an operating system will be powered by a microprocessor.

MEDIATEK MT6260

Online shopping site eBay is awash with budget smartwatches at the moment, with many often powered by a 'system on a chip' (SoC) from Taiwanese chip company MediaTek. One such popular example is the

MT6260, based on old ARM7-class CPU technology from chip designer ARM, the team responsible for just about every smartphone and tablet on the market. Word on the street is this chip, with its 32-bit processor, built-in 3G (GSM) connectivity, Bluetooth and Wi-Fi, sells for a paltry US\$3 each.

The processor itself clocks in at 364MHz and it's become a popular choice amongst designers in Asia not just for smartwatches, but basic-function mobile phones as well — not to mention 'watch phones', like the ZGPAX S28, which can make GSM calls on its own thanks to a built-in SIM card slot and sells for under US\$50 online.



Chipmaker Atmel's new SAML21 can last for decades on a single battery.



The vaguely-familiar TW64 fitness band comes in a range of fruity colours.

"AUSTRALIA'S OWN CSIRO IS ALSO IN THE MIX WHEN IT COMES TO THINKING UP NEW WEARABLE TECHNOLOGY."

There are even plans to reverse-engineer and 'open source' the chip for the maker community — check out the Fernvale Project (tinyurl.com/nf2yk72), which aims to create a shield adding it to the popular Arduino series of DIY boards.

SMARTWATCHES UNDER \$20?

In September 2014, market analysts Gartner predicted we would see Android-based smartwatches drop below \$30 during this year (tinyurl.com/modzk2n). We haven't got there just yet, but that hasn't stopped retailers in Asia from selling fitness band-style smartwatches for under US\$20.

Some of the designs, such as the TW64, look strangely familiar (did someone say 'Fitbit Charge?'), and sell on eBay for under US\$15. The chip behind the TW64 is the QN9021, a 32MHz ARM Cortex M0+ microcontroller with built-in Bluetooth 4.0 LE (low energy) radio made by Silicon Valley company, Quintic, which was recently bought by NXP Semiconductor, formerly a division of Dutch giant Philips.

The chip itself has modest specs with 64KB of program and 128KB of data flash, but for Bluetooth-connected fitness and sports trackers, that's all you need. What's more, the QN9021 is another you can buy for under \$3 each (manufacturers purchasing as few as 1,000 can have them for as little as \$1.47 each — no surprise these smartwatches are cheap!).

DECADES OF BATTERY LIFE

Smartwatch demand in 2015 is expected to grow 500%, according to the latest forecast by market analysts IDC, which will drive demand for new processors that run on even less power than the MT6260, QN9021 and others of their generation.

Chip maker Atmel is better known as the supplier of chips for the extremely popular Arduino series of DIY microcontroller boards

used to make everything from Christmas lights to robots and drones. But in late-March, the company announced a new chip family with an extremely-low-power consumption called the SAML21. Deep-sleep standby power for this chip is measured at just 200-nanoamps (0.0000002-amps). Even on a tiny 80mAh battery, that's equivalent of a 400,000 hour run time — no wonder the battery life of this little chip is being described as 'decades'. According to Atmel, this currently makes the SAML21 the lowest-power consumption 32-bit ARM core in the world — and ripe for a slew of new wearable devices.

The SAML21 is another ARM Cortex M0+ chip, this time running at up to 48MHz (for now) and will be aimed at the IoT market. But given we're seeing the same class of microcontroller unit featuring in Fitbit clones, it's likely to be only a matter of time before fitness bands start delivering battery life measured in weeks, if not months, thanks to this chip.

NEW ALUMINIUM-ION BATTERY

While Lithium-polymer remains the battery technology of choice for everything from cars to watches, it's been that way for much of the last ten years. However, in early-April, US scientists announced a breakthrough in a long-term project that could revolutionise the way we use batteries.

The team from Stanford University has developed a battery made from Aluminium and graphite that can be charged more than 7,500 times, but the real kicker is that it can be charged in just 60 seconds (tinyurl.com/p3ea67d). At best, current Lithium-ion batteries can be charged up to 1,000 times; Lithium-polymer up to 500. The new battery has a voltage of 2.0-volts, but is even being seen as a replacement for the millions of the AA and AAA-size batteries used every day. It's still early days and plenty of development work still

needs to be done, but combine Atmel's SAML21 chip with the Aluminium-ion battery and you have a potential processing block likely to last longer than you or I will.

CSIRO INVENTS FLEXIBLE BATTERY

Australia's own CSIRO is also in the mix when it comes to thinking up new wearable technology. The Australian government agency's Advanced Energy Storage team has developed what it calls 'FIED' — Flexible Integrated Energy Device. The platform has three parts — a new flexible, bendable battery; energy-harvesting technology to charge it; and washable fabric made from conductive fibres that can electrically connect the various wearable components together. Right now, the CSIRO is looking for commercial partners to join the program (tinyurl.com/kx9egwj).

WATCH WHERE YOU USE IT

And finally, it's long been illegal to use a mobile phone while driving in Australia. However, if you're thinking you can tap away on your shiny new Apple Watch while driving, safe in the knowledge that it isn't a mobile phone, you might just want to plan a re-think.

A recent report in the *Sydney Morning Herald* (tinyurl.com/kh6zb33) suggested that police in New South Wales and Victoria would deem it a fine-worthy act if a motorist used a smartwatch while driving. According to a statement received by the newspaper from Victoria Police, 'anyone caught using mobile phones, GPS or other electronic devices while driving could face penalties'.

















However, as watch makers continue to blur the lines between traditional and smart watches, could the act of simply looking at the time at the wrong time eventually result in a fine? Like most recent battles between technology and the law, it'll probably be the courts that will eventually have to decide this one. ■

























BUYER'S GUIDE

YOUR READY RECKONER TO THE BEST TECHNOLOGY PRODUCTS



The *TechLife* team find the best budget, value and performance products, and the latest releases in the top technology categories. If you believe there are other products that deserve the title in any of the tech categories, let us know and give us your reasons why in 50 words or less. Equally, if there's a hot new product that's worthy of attention, we want to know. Send your email to techlife@futurenet.com.

	↓				↓
NETWORKING EQUIPMENT	ADSL ROUTERS (WITH MODEM)	 [BEST BUDGET] Netgear DGN2200 \$99 www.netgear.com.au It's only 802.11n, but it has the basics you need plus an excellent, easy-to-use interface.	 [BEST VALUE] TP-Link Archer D7 \$170 www.tp-link.com.au The UI is a little no-frills, but once set up this is a very solid AC1900 router for a price well below the average.	 [BEST PERFORMANCE] ASUS DSL-AC68U \$300 www.asus.com/au It ain't cheap, but if you want it all, this 802.11ac unit is fast and packed with handy enthusiast features.	 [NEW ON SHELF] D-Link Viper DSL-2900AL \$300 www.dlink.com.au D-Link's new AC1900 enthusiast router upgrades its predecessor with a new interface and the latest Wi-Fi tech.
	BROADBAND ROUTERS (NO MODEM)	 [BEST BUDGET] Netgear WNR2000 \$70 www.netgear.com.au It's only 802.11n, but for around \$70 this four-port router will cover the basics.	 [BEST VALUE] TP-Link Archer C7 \$150 www.tp-link.com.au This modemless version of the D7 (above) has all the basics you'll need to set up a 1,300Mbps AC network.	 [BEST PERFORMANCE] Netgear Nighthawk R7000 \$210 www.netgear.com.au If you want top speeds and premium features including great Wi-Fi range, then this is our recommendation.	 [NEW ON SHELF] ASUS RT-AC3200 \$350 www.asus.com/au ASUS has joined the 'AC3200' club with this three radio, 802.11ac unit. Includes ASUS's firmware.
	NETWORKING ACCESSORIES	 [BEST WIRELESS EXTENDER] Netgear EX6200 WiFi Range Extender \$129 www.netgear.com.au This AC extender is capable of speeds up to 867Mbps, has great range and can host storage via its USB 3.0 port.	 [BEST WIRELESS BRIDGE] Linksys WUMC710 \$140 au.linksys.com This 802.11ac bridge is a great way of linking a up to four wired network devices to a 1,300Mbps AC network.	 [BEST POWERLINE ADAPTER (BUDGET)] Netcomm NP507 \$140 www.netcomm.com.au These powerline plug adapters are a little big, but include socket passthrough and fantastic speeds.	 [BEST POWERLINE ADAPTER WITH WI-FI EXTENSION] Netcomm NP508 \$145 www.netcomm.com.au If you want to add wireless extension onto powerline capabilities, this topped our 2.4GHz Wi-Fi speed tests.
	NETWORK ATTACHED STORAGE DEVICES	 [BEST BUDGET] Lenovo Iomega IX2 \$125 (DISKLESS) www.lenovo.com You'll need to BYO drives, but this very affordable two-bay NAS offers impressive features for the price.	 [BEST VALUE] ASUSTOR AS-202TE \$295 (DISKLESS) www.asustor.com This two-bay NAS offers excellent features and can double as a media player, via XBMC and HDMI-output.	 [BEST PREMIUM] Synology DS414j \$470 (DISKLESS) www.synology.com If you need more space, this four-bay unit runs Synology's excellent NAS OS, which lets you add features via apps.	 [NEW ON SHELF] QNAP TVS-EC880 \$2430 (diskless) www.qnap.com A massive 8-drive NAS that can double as a network media player (with HDMI out) and download box.

↓			<div>NEW ENTRY</div> 		↓
	[BEST BUDGET] Jabra Solemate Mini \$69 www.jabra.com Squeezes Jabra's excellent Bluetooth speaker into a more portable package.	[BEST VALUE] Creative ZiiSound D5x \$260 au.creative.com Creative's big and beautiful-sounding D5x is fantastic value, but won't be available much longer.	[BEST PERFORMANCE] Lenco PlayLink 4 \$399 www.amberonline.com.au With an optional battery for portable play, this Bluetooth and Wi-Fi speaker is highly versatile and sounds fantastic.	[NEW ON SHELF] UE Megaboom \$350 www.ultimateears.com An upsized version of the cylindrical UE Boom, offering bigger sound... but a higher price.	
					
	[BEST BUDGET] Shure SRH440 \$130 www.jands.com.au Bright, clear sound and great bang for buck.	[BEST VALUE] Audio-Technica ATH-M50X \$199 www.audio-technica.com.au A well-priced set of over-ear headphones with fantastic audio and detachable cables.	[BEST PREMIUM] V-Moda Crossfade M-100 \$270 www.vmoda.com Warm and rich sounding cans with great clarity — these can handle anything you throw at them.	[BEST WIRELESS] Plantronics BackBeat Pro \$300 www.plantronics.com/au This Bluetooth set of cans blew us away with their great acoustics and noise-cancelling capabilities.	
				<div>NEW ENTRY</div> 	
	[BEST BUDGET] Google Chromecast \$50 play.google.com Google's wireless HDMI dongle streams content to your TV via the Play Store and a variety of third-party apps.	[BEST VALUE] Western Digital WD TV Live \$120 www.wdc.com It beats many TVs for video format support and its fast processor supports 1080p network streaming.	[BEST PERFORMANCE] Western Digital WD TV Live Hub 1TB \$230 www.wd.com A media player done right, this unit can play and serve video to other devices. Easy to use and well-featured.	[NEW ON SHELF] Google Nexus Player \$130 play.google.com This official Android-powered media player also includes access to apps and games.	
					
	[BEST BUDGET] Acer X1263 \$280 www.acer.com.au A bright DLP projector with long lamp life at a reasonable price. Perfect for presos and the odd movie.	[BEST VALUE] Epson EB-W120 \$600 www.epson.com.au This compact 3LCD, WXGA unit has good features and image quality and decently priced lamps.	[BEST HOME THEATRE] BenQ W1070 \$999 www.benq.com.au BenQ's latest 1080p home theatre unit boasts a lower price and longer lamp life than the W1100.	[NEW ON SHELF] LG MiniBeam PG60 \$999 www.lg.com/au This compact and portable home-theatre projector will go anywhere, though its not high specced.	
					
	[BEST BUDGET] Samsung UA40H6400 \$900 www.samsung.com/au This 40-inch LED unit features excellent picture quality and first-rate smart TV feature.	[BEST VALUE] Samsung UA55H7000 \$1,700 www.samsung.com/au Samsung's top-shelf 55-inch LED TV from 2014 produces great images at a nice price.	[BEST PERFORMANCE] Samsung UA60H6400AW \$2,100 www.samsung.com/au This upper-midrange 60-inch LED has rich colours, deep blacks and great uniformity.	[NEW ON SHELF] LG 55EC930T \$3,999 www.lg.com/au This comparatively-affordable 55-inch, 1080p OLED set promises dazzling colours and amazing contrast.	
					
	[BEST BUDGET] Kogan Atlas X1510 \$329 www.kogan.com.au Packs Windows 8.1, Pentium CPU, 15.6-inch screen and a 500GB hard drive for a keen price.	[BEST ULTRABOOK] Apple MacBook Air 13-inch FROM \$1,399 www.apple.com/au This thin, lightweight unit has an aluminium unibody chassis, fast CPU and is well-priced for an ultrabook.	[BEST PERFORMANCE] ASUS G751JT \$2,499 www.asus.com/au This unashamedly huge 17-inch desktop replacement packs heaps of power and a GTX 970M GPU.	[NEW ON SHELF] Venom BlackBook 15 (2014) \$3,399 www.venomcomputers.com.au This impressive 15.6-inch performance all-rounder packs in an Nvidia GTX 970, 3K screen and SSD + HDD.	

BLUETOOTH SPEAKERS
BUYER'S GUIDE
READY RECKONER

MUSIC HEADPHONES

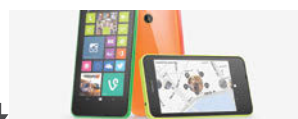
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DATA PROJECTORS

TVS

LAPTOPS, TABLETS & SMARTPHONES
LAPTOPS

SMARTPHONES
- ENTRY-LEVEL



[BEST WINDOWS]
Microsoft Lumia 635

\$180 | www.nokia.com
A simple and elegant WP8 handset with 4G. A solid entry-level choice.



[BEST BIG SCREEN]
Motorola Moto G (2014)

\$269 | www.motorola.com.au
This upgraded Moto G packs all the basics and then some; dual-SIM 3G, 5-inch 720p LCD and 8GB storage.



[BEST PERFORMANCE]
LG G2

\$449 (32GB) | www.lg.com
The G2 is basically the Nexus 5 with LG tweaks. It's sleek and fast with a 5-inch screen.



[NEW ON SHELF]
Microsoft Lumia 640XL

\$399 | www.microsoft.com
Offering a 5.7-inch screen, 13MP camera and 3,000mAh battery this big Windows Phone is equally big value.



[BEST BUDGET]
Motorola Moto X (2014)

\$550 (16GB) | www.motorola.com/au
An excellent 5.2-inch all-rounder with frequent OS updates. Shop around for the best price.



[BEST BIG SCREEN]
Samsung Galaxy Note 4

\$949 | www.samsung.com/au
The latest Note keeps the stylus and 5.7-inch screen, but upgrades the CPU and GPU to match the latest iPhones.



[BEST PREMIUM]
Apple iPhone 6

From \$869 | www.apple.com/au
The new iPhone is slimmer, curvier and faster than ever and a great reason to stick with (or reconsider joining) the Apple team.



[NEW ON SHELF]
Oppo N3

\$799 | www.oppomobile.com.au
This 'Note killer' is a great alternative to Samsung's flagship phablets, with a fantastic camera.

SMARTPHONES
- PREMIUM



[BEST BUDGET]
Samsung Galaxy Tab 4 8.0

\$240 (16GB) | www.samsung.com/au
It's getting a little long in the tooth, but this 8-inch quad-core Android tablet is our current budget pick.



[BEST COMPACT]
Apple iPad mini 2

\$369 (16GB) | www.apple.com/au
With a Retina display, the iPad mini 2 is fantastic value if you want a small tablet with all the frills.



[BEST PERFORMANCE]
Apple iPad Air

\$499 | www.apple.com/au
This iPad recently saw a \$100 price drop, which makes it the best-performing tablet under \$500.



[NEW ON SHELF]
Microsoft Surface 3

\$699 (64GB) | www.microsoft.com
A lower-end, Intel Atom-powered alternative to the Surface Pro, but still runs the full version of Windows.

TABLETS
- ENTRY-LEVEL

LAPTOPS, TABLETS & SMARTPHONES



[BEST BUDGET]
Apple iPad Air

\$499 | www.apple.com/au
If the budget doesn't extend to an Air 2, this 2013 unit is still very competitive with the latest Androids.



[BEST VERSATILITY]
Microsoft Surface Pro 3

\$1,130 | www.microsoft.com.au
The official Windows 8.1 Pro tablet has a stylus and runs traditional Windows software.



[BEST PERFORMANCE]
Apple iPad Air 2

From \$619 | www.apple.com/au
The second-gen iPad Air goes even slimmer and lighter than before and has unbelievably fast internals.



[NEW ON SHELF]
Google Nexus 9

From \$479 | play.google.com
Google's new premium 8.9-inch tablet runs Android 5.0 and is designed by HTC.

TABLETS
- PREMIUM



[BEST FOR IPAD 2/3/4]
Logitech Keyboard Case for iPad

\$90 | www.logitech.com
Offers good protection and comfy, responsive keys on a budget.



[BEST FOR IPAD AIR]
Belkin QODE Slim Keyboard Case

\$110 | www.belkin.com/au
A great keyboard and vibrant case with a kickstand make this a great option for iPad Air.



[BEST FOR IPAD MINI]
Logitech Ultrathin Keyboard Cover

\$90 | www.logitech.com
The Ultrathin combines a fantastic-quality keyboard with a metal-backed case.



[BEST FULL-SIZED KEYBOARD]
Logitech Tablet Keyboard

\$120 | www.logitech.com
If you want the full-sized typing experience, this is your best bet.

BLUETOOTH TABLET
KEYBOARDS

GADGETS & ACCESSORIES



[BEST BUDGET]
Nikon CoolPix S3300

\$150 | www.nikon.com.au
This compact camera is available in eight colours and has an ultra-slim body with 6x wide-angle lens.



[BEST COMPACT SLR]
Olympus OM-D E-M10

\$1,100 | www.olympus.com.au
A MILC with lots of lenses, fast shooting and a high-res viewfinder at a great price.



[BEST DIGITAL SLR]
Sony Alpha SLT-A65










\$1,110 | www.sony.com.au
A fantastic prosumer camera that lives up to its great specs.



[NEW ON SHELF]
Samsung NX1

\$2,200 | www.samsung.com/au
Samsung's new MILC is turning heads thanks to some first-rate lenses, great image quality and 4K video capabilities.

DIGITAL
CAMERAS

 <p>[BEST POWER BANK] TP-Link TL-PB10400</p> <p>\$50 www.tp-link.com.au This 10,400mAh power bank will let you recharge your smartphone or tablet anywhere and weighs just 241g.</p>	 <p>[BEST WIRELESS HARD DRIVE] WD My Passport Wireless 2TB</p> <p>\$330 www.wd.com Take your media collection with you and play it back from Android and iOS devices with this Wi-Fi hard drive.</p>	 <p>[BEST STYLUS] Adonit Jot Pro</p> <p>\$45 www.adonit.net This one's great for scribbling notes on Android and iOS tablets and doesn't cost the Earth.</p>	 <p>[BEST MOBILE GAMEPAD] iPega PG-9025</p> <p>~\$25 www.dx.com You'll need to buy it online, but this gamepad is nice and responsive and works with both iOS and Android.</p>	<p>TABLET & SMARTPHONE ACCESSORIES</p> <p>BUYER'S GUIDE READY RECKONER</p>
 <p>[BEST BUDGET] Toshiba Canvio Basics 1TB</p> <p>\$90 www.toshiba.com A compact portable hard drive with USB 2.0, 3.0 and backward compatibility.</p>	 <p>[BEST VALUE] Western Digital My Passport Ultra 2TB</p> <p>\$149 www.wd.com Great value, with lots of storage, good software and USB 3.0 support.</p>	 <p>[BEST PERFORMANCE] Seagate Backup Plus Fast 4TB</p> <p>\$400 www.seagate.com This speedy USB 3.0 drive transfers data at up to 220MB/s — twice as fast as most others.</p>	 <p>[NEW ON SHELF] Western Digital My Passport Pro 4TB</p> <p>\$650 www.wd.com This RAIDed unit is speedy, but only works with Thunderbolt-enabled PCs and Macs.</p>	<p>GADGETS & ACCESSORIES</p> <p>PORTABLE HARD DRIVES</p>
 <p>[BEST SMARTWATCH FOR ANDROID] LG G Watch R</p> <p>\$349 play.google.com/devices The G Watch R runs Android Wear and, best of all, it actually looks like a watch.</p>	 <p>[BEST SMARTWATCH FOR IOS] Pebble Steel</p> <p>\$289 getpebble.com Pebble's steel watch has an e-paper screen so its battery lasts a week, and it works with both Android and iOS.</p>	 <p>[BEST FITNESS BAND] Jawbone UP24</p> <p>\$165 www.jawbone.com The UP24 is our pic for fitness tracking; it monitors steps and sleep and puts it all together in a great social app.</p>	 <p>[BEST EXERCISE HEADPHONES] Jabra Sport Pulse Wireless</p> <p>\$250 www.jabra.com These in-ear buds connect to your phone via Bluetooth and have integrated heart-rate monitoring.</p>	<p>WEARABLES</p>
 <p>[BEST BUDGET] Dell S2340L</p> <p>\$230 www.dell.com.au A solid all-rounder, this 23-inch IPS display has deep colours and a nice narrow bezel.</p>	 <p>[BEST VALUE] Dell P2714H</p> <p>\$440 www.dell.com.au This quality 27-inch IPS unit has a resolution of 1,920 x 1,080 with an aspect ratio of 16:9.</p>	 <p>[BEST PERFORMANCE] ASUS PG278Q</p> <p>\$999 www.asus.com/au If you're looking for the best PC gaming display right now, there's no better than this 27-inch G-sync monitor.</p>	 <p>[NEW ON SHELF] AOC U2868PQ</p> <p>\$640 www.aocmonitor.com AOC's 28-inch TN panel at 3,840 x 2,160 is the cheapest 4K we've yet tested and great bang for buck.</p>	<p>PC MONITORS</p>
 <p>[BEST BUDGET] Tt eSports Poseidon ZX</p> <p>\$99 au.ttesports.com This basic compact board still has it where it counts, with solid performance and comfortable keys.</p>	 <p>[BEST VALUE] Logitech G710+</p> <p>\$130 www.logitech.com This brown switched mechanical gaming keyboard is comparatively quiet and has great key feel.</p>	 <p>[BEST PREMIUM] Corsair Vengeance K95 RGB</p> <p>\$230 www.corsair.com Available in multiple switch colours, the K95's backlighting can be customised in almost any shade.</p>	 <p>[NEW ON SHELF] Razer BlackWidow Chroma</p> <p>\$210 www.razerzone.com Razer's joined the multi-coloured LED club, upgrading its BlackWidow with rainbow-coloured backlighting.</p>	<p>PC PERIPHERALS</p> <p>GAMING KEYBOARDS</p>
 <p>[BEST BUDGET] Microsoft LifeChat LX-3000</p> <p>\$35 www.microsoft.com.au/hardware A cheap basic USB headset with noise-cancelling tech.</p>	 <p>[BEST VALUE] SteelSeries Siberia V2</p> <p>\$80 www.steelseries.com Luxurious with great sound and a brilliant retractable microphone.</p>	 <p>[BEST PERFORMANCE] Audio-Technica ATH-AG1</p> <p>\$349 www.audio-technica.com.au A super-comfy headset with massive drivers and fantastic sound.</p>	 <p>NEW ENTRY [NEW ON SHELF] Kingston HyperX Cloud II</p> <p>\$160 www.kingston.com These affordably-priced cans sound great across games, music and movies.</p>	<p>GAMING HEADSETS</p>

			
[BEST BUDGET] Logitech G402 Hyperion Fury \$49 www.logitech.com A hybrid-sensor gaming mouse with optical, gyro and accelerometer tracking, this one doesn't skip a beat.	[BEST VALUE] SteelSeries Sensei RAW \$70 www.steelseries.com This cut-down version lacks frills, but gets the basics right with great performance.	[BEST PERFORMANCE] Razer Taipan \$80 au.razerzone.com A super-high-resolution gaming mouse that's actually comfortable to use.	[NEW ON SHELF] Logitech G502 Proteus Core \$80 www.logitech.com This surprisingly affordable new optical mouse from Logitech offers great tunability.
			
[BEST BUDGET] Brother HL-L2340DW \$110 brother.com.au It's black and white only, but with Wi-Fi and great text print quality alignment, very fast print speeds and cheap to run.	[BEST VALUE] HP Officejet Pro 6830 \$180 www.epson.com.au A great all-rounder that's up for both photo-printing and text documents.	[BEST PHOTO PRINTER] Epson Expression XP-720 \$210 www.epson.com.au Creates fantastic-quality photo prints at a relatively affordable price.	[NEW ON SHELF] Epson WorkForce Pro WP-4540 \$449 www.epson.com.au Requires manual print head alignment, but very fast print speeds and cheap to run.
			
[BEST BUDGET] Sapphire Dual-X Radeon R7 265 \$190 www.sapphiretech.com This beats the similarly-priced GTX 750 Ti from Nvidia for value and speed.	[BEST VALUE] Sapphire SA-R9270X-2GD5-OC \$240 www.sapphiretech.com This mid-range card from AMD can run most games with all the bells and whistles at 1080p.	[BEST PREMIUM] Gigabyte GV-N970WF30C-4GD \$490 www.gigabyte.com.au If your budget stretches to around \$500, this new GeForce is extremely fast and great value.	[BEST EXTREME] MSI GTX-980-4GD5 \$780 au.msi.com This top-tier card from MSI and Nvidia is super speedy and what we'd select if money is no object.
			
[BEST BUDGET] ASRock H97M-Anniversary \$99 www.asrock.com Built to go with the Pentium G3258, this is a solid all-rounder for under \$100.	[BEST VALUE] ASRock Z97M Pro4 \$145 www.asrock.com This budget Z97 motherboard has all the basics you'll need for an upgrade to the latest Core i5 CPUs.	[BEST PERFORMANCE] ASUS Z97-A \$210 www.asus.com/au Has nearly all the things worth caring about in a high-end board and lacks little else.	[NEW ON SHELF] MSI X99 SLI Plus \$330 www.gigabyte.com.au You'll need a new X99 board to match the i7-5960X CPU below. This is one of the more affordable options...
			
[BEST BUDGET] Intel Pentium G3258 \$80 www.intel.com An extremely overclockable dual-core CPU for those looking at building a ballsy budget rig.	[BEST VALUE] Intel Core i5-4690 \$250 www.intel.com This new Core i5 chip offers great performance with low power use.	[BEST PREMIUM] Intel Core i7-4790K \$405 www.intel.com If money's no object, buy this unlocked and overclockable super-fast chip.	[NEW ON SHELF] Intel Core i7-5820K \$480 www.intel.com For only a little more than the i7-4790K, this 6-core enthusiast chip is a top performer.
			
[BEST BUDGET] Intel SSD 530 Series 120GB \$90 www.intel.com.au A fast, reliable and low-priced SSD. A great option for anyone looking for a budget SSD.	[BEST VALUE] Intel SSD 530 Series 240GB \$150 www.intel.com.au Intel's great reliability and solid performance combine with an excellent price to hit the sweet spot.	[BEST PREMIUM] SanDisk Ultra II 480GB \$250 www.sandisk.com This reasonably-priced unit from SanDisk has heaps of space for your OS, games and critical apps.	[BEST EXTREME] Samsung 850 EVO 1TB \$540 www.samsung.com/au This successor to the 840 EVO offers the best mix of speed, capacity and price for those with big needs.



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MODEM SWITCHES EFT-POS SWITCHES

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Multiple Modem Switch

Eftpos Switch

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Privacy Switch

Barge In Switch

Multiple Number Switch

Ring Delay Switch

Two Line Switch

Custom Solutions



CONTROL EQUIPMENT BY TELEPHONE LINE

Switch Power ON or OFF
Reset Power

Touch Tone Controlled Relays

PIN Security option

Share your line with FaxStream Duet or Multiple Number services



CONTROL ACCESSORIES

240V Power Switches

Normally ON or Normally OFF operation

PC Reset unit

Easy User Installation



CALL RECORDING FOR PABX OR SINGLE LINES

Single Line Model

PABX Handset Models

PC based software

Record and Playback

Easy User Installation



PABX ACCESSORIES

Paging Switches

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Door Stations

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PABX Fax Switch



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